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AMERICAN

RAILROAD JOURNAL,

AND

MECHANICS' MAGAZINE.

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VOL. VII.—NEW SERIES.—No. 7. VOL. I.

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NEW-YORK:
PUBLISHED BY THE EDITORS AND PROPRIETORS,
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(*Up Stairs.*)

1838.

☞ It is to be distinctly understood, *that for the period from January to July of the current year*, 1838, no numbers of the Journal will be issued; and that the volumes will commence with 1st *July*, 1838.

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TRANSPORTATION LIBRARY UNIVERSITY OF MICHIGAN DUPLICATE

COLUMBIA LIBRARY NEW YORK

M. W. BALDWIN, *Manufacturer of Locomotive Steam Engines, Stationery Engines, Steamboat Engines, Railroad Machinery, Sugar Mills, &c. &c., Broad Street, Philadelphia.*

References to the following Companies, where the annexed Nos. of his Engines are in use:

		Nos. of Engines.
Columbia and Philadelphia State Road,		24
Harrisburgh and Lancaster	Pa.	6
Little Schuylkill,	"	2
Cumberland Valley,	"	1
Philadelphia and Reading,	"	1
Phila., Germantown, and Norristown,	"	4
Boston and Providence,	Mass.	2
Boston and Worcester,	"	2
Utica and Schenectady,	N. Y.	12
Rensselaer and Saratoga,	"	2
Long Island,	"	2
Rochester and Tonawanda,	"	2
Clinton and Port Hudson,	Lou.	2
Island of Cuba,		2
Madison and Indianapolis,	Ind.	1
N. Cross Road,	Illinois	1
		67

		Nos. of Engines.
Philadelphia and Trenton,	N. J.	4
New-Jersey Transportation Co.	"	5
Morris and Essex,	"	1
Philadelphia, Wilmington and Baltimore,		4
Charleston and Hamburg,	S. C.	4
Central Road, Savannah,	Geo.	2
Augusta Railroad,	"	6
Monroe Railroad,	"	1
Commercial Railroad, Vicksburg,	Miss.	2
West Feliciana,	"	
Mobile and Cedar Point,	Ala.	1
Tuscumbia and Decatur,	"	1
Detroit and Ypsilanti,	Mich.	2
Adrian and Toledo,	"	2
Lake Wimico and St. Joseph's	Florida.	2
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From the annexed testimonials, it will be seen that the Engines of M. W. B., are not inferior in capacity of performance to any Engines in this, or any other country; while at the same time they combine several improvements secured by patent, and many advantages not to be found in other Engines.

One very important advantage is, the simplicity of their construction and arrangement, by which every part of the machinery is perfectly accessible while the engine stands upon the road.

The improvement in the construction of the cranks is one of *great importance*, obviating the liability to break,—an occurrence so common to most locomotive engines.

Another great advantage arises from having the fire-box before the driving wheels, thus making an equal distribution of weight, which wholly corrects the galloping or undulating motion peculiar to both 4 and 6 wheel engines, with the fire-box behind the driving shaft, making them more easy upon the road than any engines of the same capacity now in use; while, by the very simple device of throwing a portion of the weight of the tender upon the driving wheels, or detaching it at pleasure, the engine is made to possess the advantage of a light, with the adhesion of a heavy engine upon the ascents where increased adhesion is required.

In order to test their comparative merits, when used on the same roads with other engines, he suggests that a regular account be kept, of expenses of repairs, distance travelled, and work performed by each engine; which will furnish the only correct data by which to judge of their respective merits, which cannot be correctly done by a few experiments made for the purpose of effect.

manufactures three classes of Engines, Nos. 1, 2, and 3. Most of the above belong to the 3d, or smaller class, and many of them have been in use from two to ... His present engines are very much improved. One of the first class, recently drawn over the Columbia road, part of which has an ascending grade of 45 feet ... loaded cars weighing 187 tons, equal to about 700 tons on a level.

... engines or machinery promptly executed, on application to M. W. BALD... Philadelphia, or to E. L. MILLER, his agent, for contracts in the city of New York.

The following testimonials of the merits of these engines have been received from Officers ... and Superintendents of motive power, &c. &c. of several of the roads above ...

... BRANDT, Superintendent of Engines and Machinery, on the Columbia and ... Railroad, writes under date of the 11th of May, 1838:—"We have twenty-... your engines, several of which have been in use since the fall of 1834. Two of your ... engines commenced running Feb. 22d, 1837, and travelled 55,695 miles, up to the ... May, 1838, and cost for repairs during the above-mentioned time, one cent and eight ... per mile. Eight engines of the first class, have travelled from the 1st of January, ... to the 1st of May, (4 months) 40,569 miles, made 653 trips, drawing 16,836 cars; the ... receipts for these four months, I am now unable to show, as our books are not posted, ... assure you that the expenses this year will be less per mile than any former years. ... first class recently built, has drawn over the Columbia road, part of which has an ... grade of 45 feet per mile, 35 loaded cars, weighing 187 tons, equal to about 700 ... on a level, and travelled from 8 to 12 miles per hour, except on the wooden track. This ... the heaviest train that has ever passed over the road."

... T. SHIPMAN, Resident Engineer of the Long Island Railroad Company, writes ... 1838: "We have two engines of class No. 3, of your manufacture, which have ... in use since May, 1836. Their performance is worthy of the most unqualified praise. ... carry as an ordinary load, 15 freight cars, weighing 5½ tons each; and to show their ..., we have frequently taken 20 cars without difficulty, up an ascent of 35 feet to ... mile, and have carried 4 cars up a grade of 211 feet per mile for a distance of 2,100 ... The average speed for freight is 10 miles, and for passengers, from 20 to 25 miles per ... In the summer of 1837, they performed the distance of 162 miles each day, and from ... journal which now lies before me, it appears that under this severe usage, there was no ... in either of these engines for 6 months, which rendered a change in their usual time ... necessary, or caused any delay, either in the transportation of passengers or ... I am fully satisfied that the cost of repairs does not exceed one half that of a four ... engine doing the same work."

... CASH, superintendent of motive power, on the Norristown Railroad, says under ... May, 1838: "I take great pleasure in bearing testimony to the excellence of ... engines. They are well adapted to light or heavy loads. With one of the small class ... has been nearly three years in constant service, I have drawn a train of 750 passen... ... grades of 32 feet per mile, at the rate of 14 miles per hour."

... ELLIOT, Superintendent of Motive power, on the Philadelphia, Wilmington, and ... Railroad, writes: "After an experience of several years with Locomotive ... on different roads, I am of opinion that the engines of M. W. Baldwin, are easier ... the road than any engines in use, and that they combine more advantages than any ... within my knowledge. They have been almost constantly running for the last ... months. The engine Brandywine, has been running 265 days, at a cost for ... of $65 17, and has lost but 5 days since she was put on the road. The Christiana ... running 135 days at a cost of but $20 for repairs. Their average speed is 24 ... per hour, including stoppages."

... CANNON, President, and L. R. SARGENT, superintendent of the Rensselaer and ... Railroad Company, say under date of 29th of May, 1838: "We have two of ... locomotives which have been in use about three years. They *work well* in every ... and I deem it but an act of justice to say that the manufacture and materials of ... have proved to be of the highest order, and I have evidence from the official reports of ... companies, and my own experience here, that your engines will, in *performance* and ... *repairs*, bear comparison with any engines made in this, or any other country."

... WOOLSEY, Esq. President of the Boston and Providence Railroad Company ... the 31st of May, 1838: "We have three of your Engines, which have been in ... about June, 1836. We have never had occasion to put them to their maximum ... They have carried 17 freight cars of gross weight, say 85 tons, engine and ten... ... included, over the road at an average speed of 10 miles per hour, including an ascent ... in length, one half mile of which is 42½ feet per mile, and the remaining four and ... 37½ feet per mile. They carry ten passenger, and three baggage cars, very ... the road, at an average speed of 18 or 20 miles per hour. Your engines give ... satisfaction."

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MACHINE WORKS OF ROGERS, KETCHUM & GROSVENOR, Paterson, New Jersey.

The undersigned propose to furnish for the following articles, manufactured by them, of the most superior description in every particular. Their works being extensive, and the number of hands employed being large, they are desirous to execute both large and small orders with promptness and dispatch.

RAILROAD WORK.

Locomotive Steam Engines and Tenders; Driving and other Locomotive Wheels; Axles Springs and Tire; Car Wheels of cast iron, from a variety of patterns, and Chilled Car Wheels of cast iron with wrought Tires; Axles of best American refined iron; Springs; Boxes and Bottles for Cars.

COTTON, WOOL, & FLAX MACHINERY,

Of all descriptions and of the most improved patterns, Style, and Workmanship.

Mill Gearing and Millwright work generally; Hydraulic and other Presses; Press Screws; Calenders; Lathes and Tools of all kinds; Iron and Brass Castings of all descriptions.

ROGERS, KETCHUM & GROSVENOR,
Paterson, N. J. or 60 Wall-st. New-York.
5tf

RAILWAY IRON, LOCOMOTIVES, &c. &c.

THE subscribers offer the following articles for sale:—

Railway Iron, flat bars with countersunk holes and mitred joints, lbs.
350 tons 58y, 15 ft in length, weighing 4 per yard
280 " 2 " ¼, " " " 3 " "
70 " 1¼ " ¼, " " " 2½ " "
80 " 1¼ " ¼, " " " 1¾ " "
90 " 1 " ¾ " " " ¾ " "

with Spikes and Splicing Plates adapted thereto. To be sold free of duty to State governments, or incorporated companies.

Orders for Pennsylvania Boiler Iron executed.

Rail Road Car and Locomotive Engine Tires, wrought and turned or untured, ready to be fitted on the wheels, viz. 30, 33, 36, 42, 44, 54, and 60 inches diameter.

E. V. Patent Chain Cable Bolts for Railway Car axles, in lengths of 12 feet 6 inches, of 13 feet 6, 22, 2, 3½, 3¾, and 5¼ inches diameter.

Chains for Inclined Planes, short and long links, manufactured from the E. V. [illegible] Bars, and proved at the greatest strain.

India Rubber Rope for Inclined Planes, made from New Zealand Wax.

Also, Patent Hemp Cordage for Inclined Planes and Canal Towing Lines.

Patent Felt for placing between the iron chair and stone block of Edge Railways.

Every description of Railway Iron, as well as Locomotive Engines, imported at the shortest notice, by the agency of one of our partners, who resides in England for this purpose.

A highly respectable American Engineer resides in England for the purpose of inspecting all Locomotives, Machinery, Railway Iron, &c. ordered through us.

A. & G. RALSTON & CO.,
28 tf Philadelphia, No. 4 South Front-st.

FRAME BRIDGES.

THE undersigned, General Agent of Col. S. H. LONG, to build Bridges, or vend the rights to others to build on his Patent Plan, would respectfully inform Railroad and Bridge Corporations, that he is prepared to make contracts to build and furnish all materials for such constructures of the kind, in any part of the United States, (Maryland excepted.)

Bridges on the above plan are to be seen at the following localities, viz: On the main road leading from Baltimore to Washington; two miles from the former place. Across the Musquashtaking river on the Military road in Maine. On the national road in Illinois at sundry points. On the Baltimore and Susquehanna Railroad at three points. On the Hudson and Paterson Railroad in two places. On the Boston and Worcester Railroad, at several points. On the Boston and Providence Railroad, at sundry points. Across the Contoocook river at Henniker, N. H. Across the Soubegan river, at Milford, N. H. Across the Connecticut river, at Hancock, N. H. Across the Androscoggin river, at Turner Centre, Maine. Across the Kennebec river, at Waterville, Maine. Across the Genesee river, at Squakiehill, Mount Morris, N. Y. Across the White River, at Hartford, Vt. Across the Connecticut River at Lebanon, N. H. Across the mouth of the Broker Straw Creek, Penn. Across the mouth of the Cataraugus Creek, N. Y. A Railroad Bridge diagonally across the Erie Canal, in the City of Rochester, N. Y. A Railroad Bridge at Upper Still Water, Orono, Maine. This Bridge is 500 feet in length; one of the spans is over 200 feet. It is probably the *firmest* wooden *bridge* ever built in America.

Notwithstanding his present engagements to build between twenty and thirty Railroad Bridges, and several common bridges, several of which are now in progress of construction, the subscriber will promptly attend to business of the kind to much greater extent and on liberal terms.

MOSES LONG.
Rochester, Jan. 19th, 1838. 4—v

ARCHIMEDES WORKS.

(100 North Moore-street, N.Y.)

THE undersigned beg leave to inform the proprietors of Rail Roads, that they are prepared to furnish all kinds of Machinery for Rail Roads, Locomotive Engines of any size, Car Wheels, such as are now in successful operation on the Camden and Amboy Rail Road, none of which have failed.—Castings of all kinds, Wheels, Axles and Boxes, furnished at the shortest notice.

H. R. DUNHAM & CO.
New York, February 19th, 1838. 4—tf

FRAME BRIDGES AGAIN.

The subscriber will build Frame Bridges in any part of the United States, Maryland not excepted, and will extend them to as long a span, and warrant them to be as strong, durable, and cheap as those made by any other method.

Having no patent right, he requires no agents. A large number of bridges of his construction are to be seen. Young gentlemen, who wish, can be instructed in the true mathematical principles of building bridges, and the application of the same to practice.

JOHN JOHNSON.
Burlington, Vt., Jan. 1838.

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AMERICAN

RAILROAD JOURNAL,

AND

MECHANICS' MAGAZINE.

No. 7, Vol. I. New Series.] OCTOBER 1, 1838. [Whole No. 319. Vol. VII.

ON our return from a tour of observation, we beg leave to return our most hearty thanks to our friends generally, for their kind attentions; but we would be wanting in courtesy, not to acknowledge particularly our indebtedness in several instances.

By the politeness of the proprietors, or those connected with them, we were enabled to examine, with much satisfaction, the Locomotive Manufactories of Mr. William Norris, Mr. R. Campbell, and of Mr. M. W. Baldwin.

To Mr. Hassinger, President of the Philadelphia, Norristown and Germantown Railroad Company—To Mr. Joseph S. Kite, Superintendant—and Mr. John Cash, Superintendant of Locomotives, we are indebted for repeated opportunities of passing over their road, and examining the machinery, &c. connected therewith.

From Mr. Peter Wager, President of the Norristown and Valley Railroad Company, we likewise have received information concerning the prospects and advancement of this work.

A very gratifying visit to the Philadelphia and Reading Railroad, was afforded by the politeness of Mr. Wirt Robinson, Chief Engineer, who accompanied us in our visit; from him and Mr. M. Robinson, Consulting Engineer, we received very ample information, and also several maps and reports. Mr. G. A. Nicholls, Resident Engineer, conducted us over the depot and extensive grounds connected with the Company's works at Reading. We are also indebted to him for the promise of particular information concerning this fine road.

To Mr. R. Wording, President of the Lancaster and Harrisburg Road, we are indebted for reports; and to the Messrs. Rallstons for several polite attentions.

From Matthew Newkirch, Esq., President of the Baltimore and Wilmington Railroad Company, we are indebted for much information, opportunity of examining the road, and also for several reports. Mr. S. Kneass, Engineer, also kindly promised us a particular description of the road.

We were much pleased with a visit to the extensive Car Manufactory of Messrs. Betts, Pusey and Hanlan, at Wilmington; where we also collected some information in regard to the improvement in cars, &c.

From John Randall, Esq., C. E., we received information concerning several works.

To Mr. B. Latrobe, of the Baltimore and Ohio Railroad, who furnished reports, maps, &c.; and to Mr. Henry Kreles, we are indebted for an inspection of sundry maps, profiles, and also for the opportunity of passing over the Baltimore and Ohio Railroad.

From Isaac Trimble, C. E.; M. G. Winchester, and other gentlemen, directors, &c. of the Baltimore and Susquehanna Railroad Company, we received many polite attentions, and an excellent opportunity of examining so creditable a work.

For drawings and explanations in regard to the Locomotives used on the Baltimore and Ohio Railroad, we are indebted to Mr. R. Winans.

To them, and others who have tendered their polite attentions, we beg leave to return our warmest acknowledgments, with a promise to use the information so acquired for the greatest possible benefit of all concerned in the cause of internal improvements.

Kite's Patent Safety Beam.

Among the many improvements in regard to Railroads, presented to our notice during our recent tour, but few have greater claims to perfect simplicity and entire efficacy, than the Safety Beam of Mr. Joseph S. Kite, Superintendant of the Philadelphia and Norristown Railroad.

On the Southern Roads, no accident appears to be dreaded by travellers so much as a breaking of the axle. The fear on this score seems to have originated in several fatal accidents, particularly with the four wheel cars. The invention of Mr. Kite is calculated not only to prevent any danger from such breakage, but we think, also, to prevent such breakage in many instances.

We had an unexpected opportunity of witnessing its efficacy as a *Safety* Beam. From some cause unknown to us, a wheel of an eight wheel car had cracked and broke to pieces, while under way. The front truck was thrown off the track, but most fortunately the axle remained entire, and this we attribute entirely to the fact that the sudden strain was

received upon the boxes in the Safety Beam, and any further fracture prevented.

Had the axle been broken, the car must have been dashed entirely off the track, and the passengers seriously injured. As it was, there was not the slightest injury done to any one, and the car was not even scratched, and in nowise hurt save in the wheel.

It has been objected to the use of these and other preventives, that it matters not whether they are applied or not, for the people do not ask the question—"Has this car Safety Beams?" before they enter it. We are pleased in being able to say that the public *are* enlightened on this subject, and *do* ask such questions—and so well convinced are companies of this fact, that we find nearly every where the words "*Safety Beam*," written on the cars; and in all instances where the trucks are marked as having Kite's Patent Safety Beam, we can assure our readers that the cars *are* patronized in preference to any other.

The general use of this simple preventive of accidents is a sure test of its excellence, and if *one* life has already been saved by its use—we consider the community benefitted to more than ten times the amount of its small cost.

We subjoin testimonials highly commendatory of Mr. Kite's invention, which we think cannot be too generally praised and carried into use.

In our next number, we intend making some remarks upon the use of eight-wheel cars.

To the Public.—In consequence of the late lamentable accident upon the Columbia and Philadelphia Railway, (caused by the breaking of an axle of one of the cars,) the subscriber is again induced to call the attention of the public to his improvement, by which such accidents can be effectually guarded against.

To enable the public to judge of the utility of the invention, he respectfully submits the opinions of gentlemen who have examined its principles.

Jos. S. Kite, Patentee.

☞ Patent Rights will be disposed of upon very moderate terms, upon application to the Patentee.

Philadelphia, October 6, 1886.

Patent Safety Beams for Railroad Cars.—The subscriber has obtained Letters Patent of the United States, for an improvement in the construction of Railroad Cars, in which, by the application of what he calls *safety beams*, the injurious effects resulting from the breaking of the axles of the wheels are entirely obviated, as the car will be sustained by them, and may even travel to a considerable distance after such accident has taken place.

These safety bars add but little to the weight of the car, and do not increase the friction in the slightest degree, and their efficiency will be apparent to any one in the least degree acquainted with the nature of such vehicles; upon this point it is confidently believed that there can be but one opinion.

Persons desirous of ascertaining the nature of this improvement, or of obtaining rights to use it, may do so by applying to the Patentee.

JOSEPH S. KITE,
Superintendent for the Philadelphia and Norristown Railroad Company, corner of Ninth and Green streets, Philadelphia.

The Committee on Sciences and the Arts, constituted by the Franklin Institute of the State of Pennsylvania, for the promotion of the Mechanic Arts, to whom was submitted by Mr. Jos. S. Kite, of Philadelphia, his improvement on Railroad Cars.

REPORT.

That it is well known that the fracture of such axles almost invariably takes place near the nave, or hubb, of the wheel, and the desideratum in such a case, is to preserve the two pieces of axle from *falling to the ground;* and consequently overturning the car. This Mr. Kite proposes to effect by introducing in each car two longitudinal pieces of timber, which he calls *safety beams*, inside of the wheels, and parallel to the usual string pieces which support the boxes or chairs of the axles.—To these inside beams are attached an additional set of chairs, which, in order to avoid unnecessary friction, are so arranged as not to come into contact with the axle, except when the latter breaks. When this happens, they arrest the descent of the wheels; and thus not only retain the car in an upright position, but may even permit it, in some cases, to proceed as before. These chairs are so constructed, with double bearings, as to allow play to two axles of different diameters; the smaller bearing being for the axle proper, and the larger one for the *nave of the wheel;* which, if the break takes place immediately at the union of the hubb and axle, becomes itself a temporary axle upon which its attached wheel revolves independently of the axle proper; the latter with its wheel being supported by the smaller bearing of the double chair. The wheels are prevented from separating transversely by means of proper keepers, outside of the chairs. The committee consider Mr. Kite's arrangement both effective and simple, and consequently recommend it as deserving of practical test.

Copied by order of the Committee.

WM. HAMILTON, Actuary.

Hall of the Franklin Institute, Philadelphia, June 12, 1834.

Philadelphia, August 30, 1834.

To Joseph S. Kite:

Sir,—I take pleasure in stating that I consider the 'Safety Beam' introduced into Railroad Cars by you, a most important and valuable improvement. It affords ample security to passengers, in case of an accidental fracture of the axle, (such as occurred on the Camden and Amboy Railroad, some time since) and adds, at the same time, but little additional weight and expense to the car. The great utility of the improvement is only apparent to the public, when it is known that all similar disasters may be avoided by its adoption in Railroad cars in general. I have reason to believe the plan will succeed, and be generally adopted.

I am, very respectfuily, your friend,

HENRY R. CAMPBELL, Engineer.

Lancaster, May 6th, 1836.

Joseph S. Kite, Esq.

Dear Sir—I have examined your improved Safety Beam for railway cars, and take great pleasure in expressing my opinion, that the improve-

ment is a valuable one, and admirably adapted to the purpose for which it was designed, viz.—the saving of lives and property.

The simplicity and economy of its arrangement, as well as the unusual degree of security which it affords both to cars and their freight, are such as affords strong recommendations for its immediate introduction into general use, particularly on railways, where steam is used as a motive power.

I shall be happy to aid you, or to hear of your success, in extending the use of an improvement so desirable. Yours, very respectfully,

EDWARD F. GAY,
Principal Engineer Columbia and Philadelphia Railway.

Newcastle, March 23d, 1835.

Mr. Joseph S. Kite:

Dear Sir,—After a close investigation of the principles and arrangement of your Patent Safety Beams for railroad carriages, &c. I feel no hesitation in recommending them to the attention of all companies or persons interested in the transportation of passengers or goods on railways, being by far the most simple, economical, and safe contrivance, in my opinion, which has yet come under my notice.

With great respect, yours, &c.
EDWARD G. YOUNG,
Engineer in Chief, N. C. and F. T. R. R.

I fully concur in the above recommendation of your Patent Safety Beams for railroad carriages,
T. STOCKTON,
Superintending Director of N. C. and F. T. R. R.

Joseph S. Kite, Esq.:

Dear Sir,—I have examined your improvement of Safety Beams for railway cars, and take pleasure in saying, I believe it to be a valuable one, which if generally adopted, would materially lessen the liability to accident, and consequent destruction of property. It needs only an inspection to satisfy the most sceptical of its great utility.

Very respectfully, yours,
JOHN S. CASH,
Late Sup. Motive Power, Columbia and Philadelphia R. R.
Philadelphia, September 30th, 1836.

New-York, 1st May, 1836.

Joseph S. Kite, Esq., Philadelphia.

Dear Sir—From the examination of the model of Wheels and Axles for a railroad car that you showed me when in Philadelphia, I consider the invention of much public utility, and have not the least doubt but that the plan which you have adopted, will be the means of preventing those serious accidents from the breaking of the axles of railroad cars.

I am, dear sir, yours,
ADAM HALL,
Engineer in Chief of the West Point Foundry, New-York.

Having examined the invention of Jos. S. Kite's Safety Beams for railroad cars, and seen its practical utility tested by numerous experiments, I have no hesitation in recommending it to all companies and individuals concerned in the building of cars, as the best security against railroad accidents, that has been offered to the public. The value of this

improvement, affecting the security of the thousands of passengers daily conveyed on Railroads, throughout the United States is so great, and the expense of its introduction so trifling, that we may reasonably hope to see it speedily and universally adopted. WM. LEWIS, Engineer.

Philadelphia, November 8, 1834.

Instruction in Civil Engineering—Literary and Scientific Course of Columbia College.

We have been repeatedly asked where a complete course of preparatory instruction for those intending this profession might be obtained; we have only to refer those desiring such instruction, to the advertisement on our cover. The advantages offered by this course are greater than can elsewhere be obtained in this country.

Genesee Valley Canal.

OUR readers will perceive by the advertisement on the cover, that a large portion of this work is about to be placed under contract. The following letter from the Chief Engineer, explains certain changes in the estimates, which we are glad to find are based upon the superior character of the construction. A permanent and durable work is greatly to be desired, when the importance of the work is as great as in this instance.

Cuba, September 24th, 1838.

To the Editors of the Railroad Journal.

GENTLEMEN,—You will see by this notice that a large portion of the Genesee Valley Canal is about to be put under contract.

This letting embraces all the work on the line not contracted for, excepting about 18 or 20 miles at the southern extremity, and will probably cost some $2,500,000.

The estimate of the whole cost of this Canal, upon the present plan, is not yet completed, but will range somewhere between four and five millions. The estimate of 1834 for this work was about $2,000,000. This difference in cost is owing to a change in the character of the work. The estimates of 1834 were based upon plans of a temporary character—Locks of wood, with dry walls, &c. The present plans are for work of the most substantial and permanent character, and so far as the work has progressed, I presume I shall be correct in saying, that, in point of durability, it is not surpassed by any similar work in this State; except it may be by some of the new works now being constructed on the Erie Canal.

In connexion with the proposed improvements in the navigation of the Allegany River, this work has been gradually growing in importance with the public; and hence the necessity and importance of permanency in its construction.

Very respectfully, yours, &c.

FRED. C. MILLS.

Atlantic Steam Navigation.

Our readers will be pleased to learn of the safe arrival of the "*Great Western,*" after a voyage of only 16 days, with much tempestuous and adverse weather.

The following extract from the N. Y. American gives several interesting particulars under this head.

"The arrival of the steam packet GREAT WESTERN, Lieut. Hoskin, puts us in possession of intelligence to the 8th inst., from Bristol, which port she left at half past five that evening, and from London to the evening of the day previous. The great success of this enterprize has confirmed the timid and almost crazed the sanguine.

"She brings *one hundred and forty cabin passengers.* All her berths were engaged before her arrival at Bristol. The London Times says:—'So numerous were the applications, and of course the number disappointed, that premiums of twenty guineas have been offered, and would be given, for berths on the first refusal of vacancies from parties who by any accident might be prevented from going. In one instance, a party having engaged a double berth, was written to in Devonshire, to request accommodation for a passenger, if the whole were not absolutely wanted. The directors have fitted up every yard of disposable space on the deck, as well as below, in order to make room for the number stated. Upon the eighty-seven passengers home, and the 130 out, at 40 guineas passage money per head in the saloon, and 35 guineas cabin, each way, the Directors of the Great Western will have received therefore, upwards of 8,000*l*, exclusive of the benefit derived from the conveyance of goods, of which the Great Western brought from New-York to the extent of about 200 tons measurement.'

"The Liverpool Albion says, that the last trip of the Great Western netted 6,000*l*, after deducting the 'keep' of the passengers. The trip occupied 29 days.

"The *Royal William* was to leave Liverpool on the 20th, and the new steam ship *Liverpool* has been purchased by the same company, and will sail on the 20th October. We may look for the former in ten days, so that our doleful anticipations of a cessation of steam navigation will not be realized.

"We also learn that advices received by the Western, from the Secretary and Directors of the British and American Steam Navigation Company of London, state that the British Queen is expected to be at sea in November. The company have ordered 1000 tons of coal, now on the way to this city from Liverpool and Scotland, to supply the British Queen.

"The steam ship President was in frame, and would be ready for the station next summer or autumn.

"The Western has made this passage in 16 days, with much head winds and heavy gales, and has behaved nobly throughout. She made her passage out in 13½ days. The Royal William was but one day longer, the greater distance up the channel to Liverpool, just making that difference."

Central Railroad.

We notice the arrival of the Shannon with upwards of 500 tons of iron rails for this road. We understand that another cargo of about the same quantity is on its way, and may be expected here in a few days. These

parcels, with the iron now at the depot, will lay upwards of 80 miles.—We learn that the contractor for laying superstructure is now at work on the forty-seventh mile of the road. In the course of ten days, passengers to Macon will be carried on the road 40 miles; and cotton will be transported on the 15th day of October, from the Little Ogechee 46 miles from the city. The work has been going on briskly during the summer, and we hope to see, in the course of the ensuing month, from 1500 to 2000 additional laborers on the road.—*Georgian.*

Description of the Construction of the First Division of the Long Island Railroad, with Remarks. By an ENGINEER.

(Continued from page 188.)

To ensure the regularity and maximum accommodation desired, there must exist two species of turn-outs, or passing places, the one species such as exists at present for the accommodation of local business, the other species must have in view singly the accommodation of the greatest amount of long business on the road, or the non-interference of the trains, by regulating their passing places, so that at the time of starting the points of meeting shall always be known; this can only be effected by making these places correspond with certain divisions of time, hours or half-hours, and by determining an uniform rate of speed for all the engines at all times; or, if it should be necessary to have two descriptions of engines on the road, and two degrees of speed, that there should be two sets of passing places to correspond. To illustrate our meaning, we shall first suppose that there is but one class of engines, and one rate of speed admitted, and shall locate the passing place to correspond with hours. On the Long Island Railroad, any given uniformity of speed will be interrupted on the distance between Brooklyn and Bedford, where horses are at present used; this part of the road comprising four miles, will be left out of consideration; being situated at one end of the road, it will not interfere with our reasoning concerning the remainder; the number of horses maintained there must always be sufficient to meet the maximum trade; and there are two tracks laid on this portion of the road.

The accompanying diagram No. 1, will explain what is meant more clearly than any description: the figures at the top and bottom, correspond with the hours of a day, the figures at the ends, indicate the distances in divisions of ten miles each; the road is assumed as 100 miles long; the distance between Brooklyn and Bedford, travelled by horses, being four miles, the remaining distance to be travelled by engines, is 96 miles; 96 miles then, is the space to which the lines in the diagram are confined: if the rate of travel is 20 miles an hour throughout, and there being no high inclinations, there can be no difficulty in maintaining this uniformity of speed on this road, the time per mile will be 3 minutes, the time for 96 miles, 288 minutes, or 4 hours 48 minutes: if the engines are ready to start from Bedford at the beginning of any hour, they will have reached the other end in 4 hours and 48 minutes. I have supposed them to start from Bedford at 12 minutes *after* any particular hour, by which arrangement, they will reach their destination at the end of an hour; if the start be at 12 minutes after 6, the eastern termination will be reached at 11 o'clock; any other arrangement would answer equally well, provided always the intervals between the starts at either end correspond with

the times for which the diagram is prepared, in this case, to hours; here, since the time has been assumed at Bedford at 12 minutes after any hour, it must be 12 minutes after 6, 12 minutes after 7, 12 minutes after 8, 9, 10, 11, &c., and at the eastern termination, with corresponding intervals of an hour, in this diagram at 6, 7, 8, 9, 10, &c. The upper horizontal line shows the Bedford end of the road, the lower the Eastern end; the intervening dark diagonal lines indicate the courses of trains starting every hour from either end, and travelling at a rate of 20 miles an hour; the points of intersection of these lines show the points where the trains would meet, and where, therefore, it would be necessary to have turn outs: if a train starts from Bedford in the upper line at 12 minutes after 4, (the distance being 96 miles, and the time 4° 48″) it will reach the lower line or Eastern end at 9 o'clock; if there were trains on the road coming in the opposite direction, and which had started from the opposite end at intervals of an hour, it would meet nine of these trains at the points G H I K L M N O P, distant ten miles apart; there would require, therefore, to be nine passing places, each distant ten miles apart. The velocities of the other trains being uniform, and the same as this, and the times of starting as already said at intervals of an hour, it could not possibly meet any greater number of trains; nine passing places would, therefore, under this arrangement, be the maximum; the road, however, would probably never be occupied by so many trains, and the number of passing places might, therefore, be reduced to accommodate simply the number of trains required for the maximum business of the road; this arrangement would very well answer on an inland road, but the times of the steamboat trains on this road being always uncertain, all the turn-outs would be required to meet this evil, and to enable trains to start from the steamboat end at intervals of an hour, without interfering with, or encountering any other trains which might be on the road, and which would only be on the road in accordance with the regulated times, and would therefore in all cases, be met at one or the other of the passing places, and only there. If the intervals of an hour should be found too great, and they probably would not, intervals of half an hour might be adopted from the steamboat end, by which arrangement the number of passing places would require to be doubled. The immense amount of business which such a system would accommodate, will be at once perceived.

We shall now consider the effect which a second description of trains, with a different speed, would have on this arrangement. Suppose that it were desirable, in addition to the trains moving at 20 miles an hour, to have another description moving at the rate of 15 miles an hour; the time occupied on 96 miles in this instance, would be 384 minutes, or 6 hours and 24 minutes; and observing the same intervals of time in starting, and securing the full hour at the Eastern end, the dotted lines will represent the courses of this new series of trains, and the mode in which they would interfere with each other; and with the trains moving at 20 miles an hour, the courses of which are represented by the full black lines. The number of intersections, and consequently, the number of passing places required, would be under this arrangement 30; with such a system and the road fully occupied, there would be too much time lost at the passing places, and the trains would not be able, probably, to maintain their given speed. This, however, could never occur in practice, for were the business so extensive, it would be more than sufficient to maintain two tracks. If, however, two speeds were admitted on a road, such as the Long Island, the same uncertainty consequent on the steamboat

arrivals, already adverted to, would still require this full number of passing places, although the trains daily moving from either end, might not exceed five or six: we should have to provide, therefore, for the contingency of a meeting during the day at least, (for during the night, the 15 mile trains would not be in operation,) of the second description with any hour of starting, the number of passing places, would not, however, affect the time of the engine, since they would not come into operation probably more than four times in the course of a trip; engines and carriages, however, are always more liable to accidents at the passing places, than on any other portions of the road; the less numerous they are, therefore, the better, and hence, the great advantage which would accrue from having but one rate of speed for all trains, whether carrying freight or passengers; in the one case, the number of passing places would be nine; in the other case, thirty; the same number of trains could be on the road in the first case, as the second, and the intervals of starting would be the same, the greater speed of one portion of the machinery would induce a greater expence for repairs in proportion, but this might be fairly set against other advantages which accrue from the single rate; the reduced liability to accidents, the uniformity in the construction of the machines used, and the saving of attendance at the turn-outs.

The diagram No. 1, may be viewed as a table showing the operation of the trains at any point of the road; the scale of passing places at one end, and the corresponding letters will further illustrate it.

Reference will now be made to diagram No. 2, for the purpose of appreciating the effect of a given amount of business on the road, on the same system; we have there supposed eight trains to leave either end of the road daily, an amount of travel and business which would probably exceed the average demands for many years to come; of these eight trains, four are intended to accommodate the Boston business, two for passengers, and two for freight, and these are supposed to travel at the rate of 20 miles an hour; the other four are intended to accommodate the island business, two for passengers, and two for freight, and travel with a speed of 15 miles an hour. The letters A B C D, indicate the times of starting of the Boston trains from Bedford, the accented letters A′ B′ C′ D′, the times of starting of the Boston trains from the Eastern end, and moving towards Brooklyn. The letters E F G H, indicate the times of starting of the accommodation trains from Bedford; the accented letters E′ F′ G′ H′, the times of starting of the same description of trains from the Eastern end.

The intersections of the lines marking the courses of the different trains, show the passing places required; these, under this management, would be 13, but this limited number of passing places would not admit of that variation in the times of starting, which, at the Eastern end, must always exist; although, therefore, not more than thirteen turn-outs would be in operation in one day, there would be the full number (30) required to meet the irregularities of the Eastern end, and accordingly, one turn-out would be in operation one day, and another another, corresponding with the starts.

We now refer to diagram No. 3, which exhibits the manner in which the same number of trains would be accommodated, on the presumption that these trains, instead of travelling with different velocities, travelled with one and the same velocity, viz: 20 miles an hour: in this case, the distances between the turn-outs would be equal throughout the road, in

the other case, the positions of the turn-outs are very unequal. To meet this particular amount of business, nine turn-outs would in diagram No. 3, be required, there being nine intersections; if we add another turn-out, there will be ten in all, distant each ten miles apart, and this number of turn-outs would accommodate as well, all changes in the times of the trains, and all additional or extra trains occurring at intervals of an hour. If lines be added to the diagram for trains starting at any other corresponding hours, such as 12 minutes after 8, or 9, or 10, from the Bedford end, or at 7, 8, 9, &c. from the eastern end, it will be seen that they do not elicit in their intersections, any new positions for turn-outs, but that they will always be comprehended under one or other of the ten turn-outs already mentioned, and the positions of which are exhibited in the diagram by horizontal lines, corresponding with the figures for miles. Such an arrangement, therefore, it will be seen, would accommodate a much greater amount of business than is likely to exist for some time to come, and such an arrangement, therefore, with a single track, or, that explained in diagram No. 2, is assumed as amply sufficient to accommodate the demands of the public, and satisfy the purposes of the road.

Recollecting the remarks which led to the above considerations, relative to the capacities of the road, and having in view the entire adequacy of a single track arranged as above, I shall now proceed with my object, which was to introduce a more perfect system of drainage, without increasing the outlays usual at present, and also without impairing the efficiency of the road in respect of accommodations.

It will be proper to consider first, the value of the present width for the purposes in view. Fig. 1, represents the road in cutting, and the manner in which its width is disposed of; in conformity with the fact of its being graduated for a double track, the single track laid occupies one side of the centre line, and the space on the other side is in the meantime unoccupied. This unoccupied space is frequently appropriated, especially when there is no prospect of a second track being required for some years, towards securing a depth and width of drain, which the legitimate side does not admit of. This mode of draining, however, is contingent and temporary, and will not militate against our assertion, that there does not exist a sufficient provision for this purpose, if it is true that the legitimate side, or space, belonging to the side of the track *laid* is inadequate. I observe, first, that the intention of the drain being to prevent the water from remaining and settling in the superstructure, the level of the bottom of the drain should be below the level of the bottom of the superstructure, otherwise, when, during rainy weather, the drain is full of water, that water will naturally find its way below, and among the timbers of the superstructure, instead of being drawn therefrom when existing there. 2d. The superstructure is always supposed to rest on a foundation of gravel or sand, or broken stone, and it is important that this foundation should at all times be free from moisture; this foundation for the superstructure, we shall estimate at nine inches in depth. When the natural earth is not of this description, it is usual among engineers now, to remove that earth, and replace it with suitable materials: the bottom of the drain, then, ought not only to be below the bottom of the superstructure, but below the bottom of this foundation. When the earth, on which this foundation rests, is clay, the importance of this assertion will be sufficiently obvious; when the earth is itself very good gravel, or sand, and which admits, therefore, easily of the percolation and passage of water, the water not being retained so long, the evil produced will be proportionally less.

On the first division of the Long Island Railroad, the stuff is of this nature, but on the remainder of the road, every variety will occur: 3d, the sides of the drain must have a certain slope, and be formed of a material not easily removed by water, otherwise they must be continually breaking, caving in, and hence, the drain filling up. The natural slope of sand is $1\frac{1}{2}$ to one; in gravel or sand, therefore, the slopes cannot be less for drains, but this slope will not be sufficient, for no earth can maintain the same slope when wet as when dry, and wet sand or gravel will not maintain a slope of 2 to 1, far less $1\frac{1}{2}$ to 1. Sand and gravel, however, unless the gravel be very coarse and heavy, are easily displaced and removed by water; the particles possess no cohesive properties, nor are their component parts sufficiently massy to enable them to resist the action of water, hence the slightest current removes them from their position, and it is well known that no ditch, cut through sand or gravel, maintains its form for any length of time; these substances are therefore entirely inappropriate.

The side drain A, of fig. 1, is shown in figures 4 and 5, on a larger scale, marked there a' and a'': in fig. 5 *c* (and *c* on fig. 2 and 3,) shows the sills and additional pieces laid at the junction of rails; B shows the mode of laying additional pieces at the junction of sills, and in fig. 4, D shows the mode with two sills, dispensing altogether with the additional pieces; in the first instance at C, the bottom of the drain, when in its perfect and best state, is six inches below the bottom of the sills; in the second instance, at B, the bottom of the drain, if 4-inch plank is used, is two inches below the bottom of the sill, or three inches with 3-inch plank; in the third instance, at D, the bottom of the drain is three inches below the bottom of the sill. Again, and on the supposition that there should be nine inches of sand or gravel below the sills, and that this portion, or immediate foundation, should be always as exempt from moisture, as the nature of the case will admit; the line *m* of fig. 5, will correspond with this depth for the track laid with single sills, or when additional pieces are not placed below, as at C, and this line or depth will then be found three inches below the level of the bottom of the drain, as represented in its best state, the line m' corresponding with the mode B, will be seven inches below the bottom of the drain, and the line m'' corresponding with the mode D will be six inches below the bottom of the drain. We see, therefore, that if the form of the drain could be maintained in sand, and it cannot, it would always, when occupied by six inches of water, flood the planks, and would necessarily be entirely ineffectual as a drain in removing water from the gravel or sand, or broken stone, on which the plank rests. In summer, the sand would become soft and pliable as quicksand, should there happen to exist a stratum of clay below it; in winter, the same, or any materials, would, by the action of frost on the water, be swelled and distorted, and the superstructure with it; but the drain will rarely be found in the perfect state in which it has been supposed; a days' rain will rapidly obliterate all trace of a drain formed in sand or gravel, and as the damage done by the choking of the drains is rarely perceived until the rain or storm is over, the evil has reached its limit before it is known.

The mode in which the water acts on sand may be generally understood from the sketches of the same drain a'' a''' a'''', where a'' shows how the water first encroaches on the slope, and the side of the drain next the track, a''' where the slope has slightly slipped and filled up the drain, and a'''' where, after a repetition of the previous process, the slope has slipped

more extensively, and reached the rail. Those who have travelled on the Camden and Amboy Railroad, the Washington Railroad, or indeed on almost any other Railroad in the spring months, must have observed instances of this description; at least they must have observed the gangs of men at work there, on the ditches and slopes of the deep cuttings, repairing such slips; generally it is true, the slipping has been occasioned as much by improper steepness of slope, but either defect is sufficient of itself to produce this evil. It is very evident, then, that it is not sufficient that the ditches be of the requisite size and depth, unless they are lined with a material which will maintain the form originally given, while they are subjected to the action of water. In the case of the ditches before us, the size and depth are insufficient, if the materials of which they are composed were good. These, however, are equally inappropriate and unavailable, and until a better system is introduced, the same interruption and expences must be met every spring, as occur now to so great an extent on nearly every road in operation. I shall now propose the correction of both of these evils, by way of inducing at least that consideration which the subject deserves.

It will be borne in mind that I do not propose to eradicate the evils and expences attending the present system, without incurring additional outlay for the same *nominal* extent of convenience; that is, comparing a single, as modified, with the present single tracks, double with double. I shall indeed endeavour to show that in this instance, no additional expense will be incurred, because a single track is competent to do all the business required; the second track, therefore, instead of being provided for now, is altogether deferred, and the expense attending the improved system desired to be introduced, is compared with the expense attending the excavations made at present professedly for a double track. If this has been already sufficiently explained, the repetition of it here must be ascribed to the aversion to any thing like that quackery which would offer an important improvement at no additional cost That the advantage can be gained in this instance, without additional outlay, is the consequence of the previous neglect of advantages in arrangement, by which the suggested improvements in this respect, if my ideas are correct, will balance the additional outlay, which (with a double road) would otherwise have been necessary for a better system of drainage. I may make myself more plain, when I revert to the width at present adopted on single tracks, which is either 16 or 18 feet; the road proposed, is essentially a single track, but the width required, will be 23 feet; if, however, all the business of the road can be very sufficiently accommodated by a single track, then the money which would have been otherwise employed and expended in grading for a double track, with very imperfect drainage, is proposed to be applied to the perfecting and securing the single track from the interruptions and expensive repairs incident to a double under the present system.

Fig. 15 shows one half of a single track, as proposed to be improved; the dark line *n n n* and corresponding slope, show the manner in which the road would be graded in a gravel cutting. If the excavation was clay, and it was therefore required to place nine inches of gravel on the surface on which to lay the superstructure, the dotted line *o o* connecting with the dark line *n n* would then show the form which the grading would assume. For the present, and with the view of comparing the expense, we shall suppose it to be gravel, since with any other earth the other process of removing nine inches, and replacing by gravel, would be common to both

systems, and indeed would be more costly on the present, than the one proposed. During the process of excavation, all stones, or at least a sufficient quantity for the intended purpose, of from three to four inches diameter, would be laid aside. When the graduation had been completed according to the dark lines, these stones lying in the excavation in heaps at short intervals, would be applied towards lining the side drains for nine inches in depth, as shown in the sketch. Their size and weight would enable them to withstand any flow of water likely to occur, or at least any quantity which the size of the drains will admit. These stones being laid with a moderate slope of 1½ to 1, which is sufficient for such gross materials, and being individually large and heavy, may reasonably be expected to maintain the original form given to the drain, with but little repair for a great length of time; they would prevent the action of the water on the inside next the sleeper, and would therefore exempt the sleeper and sill from being undermined, instances of which occur occasionally at present. On the slope side, they would prevent the water from infringing on the bottom of the slope, undermining on that side, and would therefore, thus far exempt the slope from any liability to slip, provided it were originally formed, with an inclination such as the nature of the earth opened should require: the side drains having been thus completed, catch water drains are cut along the tops of the slopes, to intercept the surface water from the fields. These small drains are of great service to the slopes, by preventing the surface water, which sometimes collects in considerable runs, from flowing down and disfiguring them. This object will be still further secured by laying the stuff removed from the catch water drains in the form of a small mound between the top of the slope and the drain; the fence should be placed outside of the drain, that the company may always have the power to use and repair it, as circumstances may require. The graduation and draining having been thus far perfected, the superstructure is laid on the line *n n* of any proportions required. It should not, however, be sunk into or under the grade, but simply laid on it, rammed solid as usual, and the track afterwards filled in hard with gravel to the surface of the sleeper; the bottom of the sills will then be twelve inches above the bottom of the drain. The stones forming the sides of the drain being large, will obviously allow any water to pass freely from the gravel below the sills into the drain, and the frequent communications from the surface of the road, laterally to the drain by little open cuts between the sleepers, will, to a great extent, prevent the water from reaching the gravel foundation.

Figure 16 shows a mode of forming the side drains, which might be found convenient where stones were very plenty in the excavation, or when land was of sufficient importance to render a few feet less width of ground an object; the width necessary by this mode, would be three feet less than by the other; fig. 15 would require 23 feet of roadway, and fig. 16 only 20: when the excavation was through rock, something of the same form of road-bed would be proper.

In both of these figures, there is but one half of the track shown, the other half being in every respect similar; C is the centre line in this case; should space for a double track, at a future time be required, the dotted lines on either section, will show the relative positions of the side drains, and the additional width to be excavated, *c'* and *c''* in this case becoming central points; the additional width required, would, in either case, be 11 feet; this excavation would always be taken from one side, and as the space occupied by the drain might be occupied during the operation, there

would be ample room to work either carts or cars, without interfering in the least with the business of the road. If a space of four feet from the near rail was secured, to avoid any interference with the existing track, there would still remain 16 feet of space in which to excavate without interruption.

It will now be proper to submit an estimate of the expense, from which a comparison can be made: for this purpose, we shall assume 12 feet as an average depth of excavation on the road, and estimate for 100 feet of length. This depth will probably be a minimum, and the greater the depth the greater will be the difference in quantity and expense in favor of the mode proposed: we refer simply to fig 15.

	Cub. Yds.
Excavation 12 feet in depth and 23 in width, for 100 feet of length as per fig. 15 - - - - - - -	1822·2
additional from side drains, - - - - -	40·7
	1862·9
Excavation 12 feet in depth, and 26 feet in width, for 100 feet of length, as ordinarily assumed for a double track,	1955·5
additional for side drains admissable on this system,	11·1
	1966·6
The difference, - - - - - - -	103·7
We shall assume the price in either case, as 20 cents per cubic yard, including the haul into an embankment, which, as an average price, is probably a minimum. With 26 feet width, then 1966. cub. yds. at 20 cts.	$393 32
For the single track as proposed, and with 23 feet of width, we have 1862·9 cubic yards at 20 cts. - - -	$372 58
The stones laid aside for the drains having been already paid for as excavation, the laying of these, using wheelbarrow and spade, may be estimated at 75 or 20 cents, say 20; 38·8 cub. yds. of stones laid at 20,	7 76
	380 34
Difference in favor of the mode proposed, - - or $685·34 per mile.	12 9[illegible]

In the proposed width of 23 feet, by which the comparison is made, the soiling of the slopes has been kept in view, and the additional width necessary to this end secured; the soiling of the slopes, and seeding them, is, with all earths, and on all roads, a necessary provision against slipping and running, and the outlay necessary to effect this end, as well as any additional outlay for draining, is not an expense incurred to obviate remote, and therefore it might be said, superlative repairs; but repairs demanded yearly and monthly, and which are not prospective deductions from the revenue, but immediate in their operation on the yearly dividends of the road; the ditching, or draining, it is obvious, can never be secure while the slopes are insecure. It has already been said that the only slope which maintains its form on the first division of the Long Island road, is the one slope which was soiled, and whose surface has become firm and secure against even the most violent rains: the security afforded by soiling the slopes, is generally so perfect and so beneficial in its results, that the practice must very soon be universally introduced; it prevents the stuff

from slipping into and obstructing the ditches, it is therefore necessary to their proper action; it prevents the encroachments on the adjoining property which not unfrequently occur from the slopes breaking and falling in; it secures for the same reasons the stability of the fences and obviates the inconvenient repairs attending them, and the damage which ensues from their insufficiency by the escape of stock upon the rail road; it reduces in common with the improvements in draining vastly the amount of occasional and uncertain labor required on the road, as well as the amount of daily attendance. When the slopes of an excavation are to be soiled, the soil is removed from the surface of the ground at the commencement of the excavation, and laid aside until its completion, when it is thrown upon and spread over the slopes; the slopes are then immediately seeded. The proportion of stuff laid aside for this purpose having been already estimated and paid for in the estimate for the number of yards entire in a twelve feet cut, we have only now to add the expense of replacing it on the slopes, but the price already paid for removing it was 20 cents, which supposes a haul of some distance with cars or cart; the laying it aside, however, was not worth more than 12 cents, and the additional 8 cents we must take into account now under the expense of replacing it; the expense of replacing and spreading it may be worth 16 cents, or including the seeding, say 20 cents; taking 8 cents from this, we have 12 cents as the proportion now due for the additional labor; the slopes will contain 13·2 cubic yards for 100 feet of length, equal to at 12 cents $2 64; the difference in favor of the 23 feet width proposed, including the expense of drainage, when compared with the 26 feet width was shown to be $12 98 in 100 feet; if from this we deduct the $2 64, there will still remain a favorable difference of $10 34 or $545 95 per mile. There remains, however, still another deduction to be made from this amount, on account of the additional width which will be required at the passing places; this deduction will depend on the length allowed to these passing places; if their lengths be estimated at 1000 feet each, that they may be enabled to admit more than one train, and if they occur every 10th mile, the proportion per mile on which the increased width will occur, will be 100 feet; if we summarily estimate the cost of grading at $12,000 per mile, this will amount to about $200, and the result in favor will then be $200, subtracted from $545 95, equal to $345 95 per mile. The turn outs for the accommodation of the local trade can always be located at the terminal points of excavations, and the additional expense incurred by these will therefore form but a small fraction of the cost of graduation.

If, then, I have been able to express clearly my own views, I have sought to establish first, the insufficiency of a width of 26 feet as a double track for the purposes of drainage and the safety of the road; next the sufficiency of a single track, for any amount of business likely to occur on this road for many years, even should the travel and transportation equal that of the Boston and Providence rail road, and it will not probably exceed it; and again that in view of a single track being sufficient, the defects inherent in the present system (for want of space) may be removed and the drainage rendered very complete at an expense less by $346 per mile, than the cost under the present system when the road is confessedly imperfect, and although graded with a view to a double track, more than one is not intended to be laid or used, while one will at all accommodate the trade. The advantage will be, that the same amount of trade being accommodated by the perfect as

by the imperfect system, a great amount of a annual expense for occasional repairs, delays and accidents, will be saved and the yearly dividends be proportionably increased.

(To be continued.)

From the Southern Recorder.

Office Board of Commissioners—Western and Atlantic Rail Road.

MARIETTA, July 14th, 1838.

To His Excellency G. R. Gilmer: Sir:—In consequence of the absence of Major Joel Crawford, President of the Board, from the State, on important business connected with the interests of the Rail Road, the duty has been devolved upon me, of making a quarterly report of the progress of the work, and the condition of the road, entrusted to the care and direction of the Board of the Commissioners for second quarter of the current year.

In the early part of April, contracts were entered into for the grading of upwards of fifty miles of the road, and the work of construction has been progressing at an increased ratio up to the present month; and from the report of the superintendant of construction, and the character and competency of the contractors employed on the work, the commissioners have the best assurances that the grading of that part of the road, now under contract, will be completed by the first of July next. The scarcity of provisions in the section of country through which the line of the rail road passes, and the difficulty of procuring efficient laborers at this season of the year, has necessarily retarded the operations of the contractors, and the amount of work done on the various sections under contract, has fallen short of the anticipations of the board, but it is confidently believed, that after the labor necessarily bestowed upon the growing crops are completed, the services of laborers will be procured on reasonable terms, and in such numbers as will answer all the exigencies required for the completion of the work within the time specified in the contracts.

The amount of expenditures during the second quarter of the current year, on account of constructions for road, formation, masonry, bridge timber, cross ties, right of way, and pay of engineers engaged in the constructive department of the service, agreeably to the pay roll, as exhibited in the return and abstract of work done in the month of April, May, and June, with the vouchers for the several amounts paid, is herewith submitted, together with the vouchers for the expenditures incurred during the first quarter of the year; and also the quarterly report of the chief engineer, to which I respectfully beg leave to refer your excellency, for a full and comprehensive view of the condition and progress of the work, and for other important information connected with this great work of internal improvement.

The commissioners have been untiring in their efforts to procure the right of way, on the route of the Rail Road, and have succeeded in obtaining deeds of concession from nearly all the resident landholders in the counties of DeKalb and Cobb, on terms deemed reasonable; and in cases where exorbitant damages have been demanded, recourse has been taken to arbitrations, or the final award of special juries will be resorted to. In the prosecution of this delicate and unpleasant business, the commissioners have met with difficulties and obstacles little to have been anticipated in the commencement of the enterprise. As the construction of this great work was obviously intended for the special benefit of that portion of the Cherokee counties through which it runs, it was

confidently believed that the citizens of those counties would have vied with each other, in setting an example of liberality and zeal, in forwarding the progress of the work; and as the lands on the line of the road were enhanced in value by reason of the contemplated structure of the road: the land owners would have considered that enhancement of value, an ample compensation for the concession of the right of way, occupied by the space of the road, and any other inconvenience they might be subject to, in consequence of the structure of the road formation; but it has had a contrary effect upon many of the land holders, who now demand compensation for the land to be occupied by the road, and damages at a rate proportioned to the increasing value of the land. There are, however, some honorable exceptions, as we advance upon the line, some are found who are disposed to act the nobler part, and consider the benefits that themselves and their neighbors will derive from the road ample compensation for the sacrifices of a small portion of land and materials employed in its construction; instances of this highminded and generous bearing, may be found at the Chattahoochie river, Marietta, Etawah river, and at several other places.

The board have resolved to offer an additional portion of about fifty miles of the road for contract, from the 8th to the 13th of October next, beginning at the sixth section of the third division, and extending to the valley of the Conasauga river, as indicated in the chief engineer's quarterly report, above referred to. By the adoption of this measure, a larger field of enterprise will be opened to our citizens, and a greater point of attraction be given to industry and enterprise; and as the time of letting will take place at a season of the year when the great business of agriculture will have been completed for the year, slaveholders and others engaged in the farming interest, will have an opportunity of making their arrangements, so as to employ a large portion of laborers in the rail road service during the fall and winter months, a business deemed much more profitable than the growing of cotton, at the present low prices of that staple article of the southern states.

The route of that portion of the road, about being offered for contract, traverses such a level region of country, and the work of construction will be so light, that the grading will doubtless be completed nearly as soon as that portion of the road under contract; and will enable the chief engineer to employ to advantage the services of that portion of the corps of engineers now about to engage in the survey and location, to the Tennesee river, after that work shall have been completed, which is intended to be effected by the time of the next letting. The residue of the road, about forty miles, can be placed under contract, in time to be completed before a supply of iron can be procured from Europe, or at least put in such a state of forwardness, as to offer to the commissioners the option of commencing the laying of the foundation at the terminus in De Kalb county, or at the Tennessee river, as future exigencies may dictate, or a sound and economical policy may require.

It is believed that iron can be transported from Ross' landing, on terms much more favorable than can possibly be afforded from Savannah, to the terminus in De Kalb county, having to encounter the heavy expense of transportation in wagons over a considerable portion of the route. The commissioners will, however, give to this subject that mature consideration its importance demands, and adopt the course which may seem most conducive to the public interest. The getting of sleepers, or cross ties for the railroad has been measurably suspended, except on the immedi-

ate line, or space occupied by the road, the season of the year being unpropitious for the cutting of the timber to be used in contact with the ground; and as the process of Ryanizing timber for railroad purposes, attracting public attention, the commissioners are desirous of giving the subject a thorough investigation, and if the result of their inquiries should be favorable as has been represented, and the cost of the process not being greater than eight or ten cents a piece for ties of eight feet long and six inches square, good economy would dictate the adoption of the process, as timber can be sawed with great neatness and accuracy by steam sawmills placed on the line of the road, and cost less the Ryanizing process included, than the old method of selecting and hewing heart timber; as any description of timber answers the purpose, the process alluded to, rendering it impervious to putrefaction or decay.

It affords us great pleasure to state to your Excellency, that from information derived from an authentic source, the most perfect good feeling prevails on the part of the Stockholders of the Hiassee Railroad Company, toward the authorities of Georgia, and that they are pressing forward their work with a zeal and energy commensurate with the importance of the undertaking. Regarding this road as a valuable auxiliary to our great State enterprize, I cannot refrain from expressing to you my deep solicitude for the prosperity and final success of the Hiwassee road. Running from Knoxville, a distance of ninety-five miles, to the Red Council Ground, on the Georgia boundary line, a junction with the State road can be effected by a branch of not more than fifteen miles in length, and cannot fail to be as advantageous to Georgia, as it will be profitable to the Stockholders of the company. This branch should be constructed by the State, as it will be within the limits of Georgia, and cannot fail to enhance the value and importance of both roads, and tend to unite the interests of the people of each state, and to strengthen the bonds of union and good neighborship.

I beg leave to remark, that should the Legislature of Georgia at their next session, continue to pursue the wise and patriotic policy, that has actuated their councils for the last two years, in regard to the works of internal improvement, and afford the necessary facilities for carrying on this great work to a speedy and successful consummation, two years more will not elapse before the state will begin to realize the benefits of this politic and enlightened legislation. In estimating the future advantages of this road, allowance should be made for the constant advance of the country through which it passes in population and business. The fertile regions of the western counties are rapidly filling with a wealthy and enterprising population, and increasing in their business, wants, and capacities. The Western and Atlantic Rail Road will form the main link of the great chain of rail-way communication, from the southern Atlantic cities to the populous regions of Tennessee and North Alabama, and furnish a thoroughfare for travel and freight unequalled in the southern states.

The consequence must be, that when the several branch rail roads, now in a train of execution, are completed, the amount of business that will be done on the road, will far exceed any calculations that have been made upon the facts, as they have heretofore existed; and this rail road will naturally become the main thoroughfare between the western states, and the commercial cities of Georgia and South Carolina.

Very respectfully, your obedient servant, CHA'S I. BOLTON,
President (pro tem.) Board of Com'rs.

Extract from the Address of George Peabody, Esq., President of the Eastern Railroad Corporation, on the opening of that Road, August 27, 1838.

It is but little more than two years since the ground was broken for the commencement of this Road, and that part is now open for travel which is considered altogether the most difficult of construction, and attended with the greatest expense.

This rapid progress under ordinary circumstances would have been a matter of surprise, but is still more so when we reflect that it has been made during a compression of commercial affairs unprecedented in this or any other country; a condition of things which, we may venture to assert without arrogance, would have convulsed Society, and revolutionized Government, in any civilized nation of the old world. Yet, with all this acceleration, it is believed that no part has been slighted. Every improvement which experience could dictate, or ingenuity suggest, has been adopted, and the Road constructed with special reference to strength and durability.

But we are not to be the sole judges of our labors. They are to be submitted to a competent tribunal. The public, whose comfort and security are to be essentially affected by them, will soon decide how far success has crowned our exertions.

The last twelve hours have produced an important change in the relations of Salem to her flourishing neighbor, the metropolis. Her condition to-day is very much the same as if some invisible power, during the night, had removed the town, with its unconscious inhabitants, about ten miles to the southwest. We could almost fancy that there was more truth than fiction in the magical incantations ascribed to her ancient inhabitants—and that the old witches of 1692 had actually come back, to play off their pranks on a good wholesale system. Notwithstanding the employment of every means hitherto understood to shorten the distance between the two places,—a Turnpike, second to none in excellence, and a superior line of Stage Coaches,—yet it is now reduced nearly to one third of what all these could accomplish. We think there will be no cause to regret the change, and that the expectations of our citizens will be fully realized. When this project originated, much anxiety had for some time been felt lest the old lines of accommodation were to be broken up, and that Salem, instead of being an important point in the transit of passengers to and from the East, would be completely isolated, and lose her comparative standing.

Her citizens perceived that great exertions were making for the construction of a Railroad, which was intended to divert the main travel to the interior, and to deprive her, as well as the other towns on the seaboard, of the advantages they have enjoyed since the settlement of the County, of being in the direct channel of trade and communication with the East. They could not calmly regard such a contingency without making some effort to avoid it.

A subscription was first opened for a Railroad from Salem to Boston, and papers were circulated for another in continuation to the East. But it was soon thought advisable to unite the two, and the project in the latter form was favorably entertained by many of the principal towns in the county, where a great number of shares were taken.

The proprietors of East Boston, who had a few years previous made an unsuccessful application to the Legislature for a charter to build a road

to Salem, were induced to subscribe largely to ours, as soon as they ascertained it would be located through their Island. The success of the enterprise is in fact very much owing to the large interest taken by these gentlemen, and we hope their spirited action will be compensated by a full share of the anticipated benefits. The object sought for, we believe, will now be achieved, since there can be no doubt of the extension of this Road to the confines of the State; and sooner or later to the extreme Eastern section of the Union.

If the only consequence of the Road to Salem is to secure to her what she at present possesses, it will accomplish a truly valuable purpose; for she has much to lose. Few towns can boast of so many solid advantages. We think it can be said with truth that none of the same population can be named where so large a proportion of the inhabitants enjoy the means of comfortable living, and where exists more intelligence and morality. Exempt from the many evils incident to a great city, she possesses every substantial benefit.—All the ordinary sects of religion here find sympathy, and ample accommodation for public worship—Charitable and humane institutions exist nowhere in greater number or on a more respectable footing. The man of literature, science and taste, may here have access to an Athenæum containing one of the choicest libraries in the country, to an excellent collection of Native Antiquities, and to the fine Cabinets of the Society of Natural History and the East India Museum, the latter of which contains, as is well known, a collection of rare and valuable curiosities, equal, if not superior, to any of the kind in Europe or America. With a government that scrutinizes every expenditure, a well regulated police, a most liberal provision for public instruction, elevating the character and condition of the common schools—with comfortable and airy dwellings, clean streets, and though last not least, a fountain of the purest and softest water, supplying in abundance the utmost wants of the inhabitants, and pouring health into her borders:—with blessings like these, and others innumerable, we may venture to repeat, that old Salem has much to lose. Her citizens may rest content, if the strength and character of her population are unimpaired—if the means are preserved for the maintenance and continued enjoyment of such institutions—if the timely adoption of a generally acknowledged improvement should be effectual in retaining her merchants and others, whom the commercial advantages which other places afford might tempt to desert her. Owing to the general extension of commerce and the competition in trade, very little of the business of Salem is transacted at home. Her merchants, who by their early enterprise enjoyed nearly a monopoly of the East India trade, and could then dispose of their goods from their own warehouses, are now obliged to seek the great marts of the country for the sale of their cargoes; so that very few of the vessels actually owned in Salem ever enter the port. Their intercourse with Boston must necessarily be constant, and they will now be subjected to a trifling loss of time or money in their transactions. In fact, the cost of travel on the Railroad, if made use of every day in the year, would be less than the difference between the rent of a house in Salem and one of equal quality in Boston.

The ordinary time required to go to Boston over the Turnpike, may be fairly set down at two hours. If an individual were to visit Boston on Railroad only twice a week, and to save one hour each way over the old mode, his gain in a single year would be two hundred and eight hours, estimating the day at twelve hours, (for those lost are taken from th

best part of the twenty-four, especially in winter,) he would have a clear gain of seventeen days; a saving of some consequence to an industrious man, and important to every one who has a just estimate of the value of life.

An expensive undertaking to deepen the water at the wharves in the South River, is now nearly finished, which, in connexion with the Railroad, may induce some of our merchants to store their goods at home; if not in the expectation that the Road will bring purchases, at least in view of the facility which it offers to convey their goods to market at any season of the year.

The continuation of the road through the county of Essex, will, we cannot but believe, add greatly to the profits of the enterprise, and materially extend its usefulness. It certainly would not be safe to proceed with a work of this nature, carried on by private subscription, on a mere theory of the advantages to result from it, and leave the subject of an income to some doubtful contingency. States may wisely enter upon projects where immediate benefits can be conferred for the sake of a supposed future and permanent good. But so great is the expense of constructing a durable Railroad, with every proper attention to economy, that the risk of individual loss is too serious when undertaken by private means, unless a condition of things can be shown, giving every promise of a profitable investment,—unless, in fact, a location is chosen between two towns having constant intercourse, or through a country containing a thickly settled and busy population. If this view be correct, where can we look for a more favorable location than the projected line of the Eastern Railroad? The statistical returns to the last Legislature present a flattering exhibition of the resources and industry of Old Essex. These fall short of, rather than exceed, a correct estimate, and no account is rendered of the foreign commerce, which employs a large proportion of the capital of the country.

The Northern towns, viz. Amesbury, Andover, Boxford, Bradford, Haverhill and Methuen, are found to contain 18,000 inhabitants. Leaving out these towns, and also Lynnfield, Middleton, and Saugus, and not likely to make use of our Road, we have seventeen towns through which it really passes, or to which it will be easily accessible, with a population amounting to 74,000! No considerable part of this number will be found concentrated at any particular point, but the inhabitants are well diffused over the whole line of the road. Their pursuits are such as to create a constant intercourse with each other and with the metropolis. This activity arises perhaps from the circumstance, that the several branches of industry are conducted principally by individuals; there being but a small amount of corporate property in manufactures located in this part of the country.

The whole value of the cotton and woollen goods manufactured yearly, is estimated at $391,000, which, deducted from the general returns, leaves an annual produce of mechanical and manufacturing industry, carried on by private means, valued at $6,150,000, only $1,500,000 of which can be claimed by Salem. The Cod and Mackerel fisheries in seven of these towns yield a yearly value of $1,000,000, and is on the increase. When we consider, in addition to these, the extent of the Whalefishery, in which twenty-seven ships are now employed, and the immense capital invested in foreign commerce; the various mechanical pursuits dependant upon these, and the amount of labor required in Agriculture, we think we may safely conclude that the inhabitants of this part of Essex, at least, are not slumbering in idleness, and their occupations such, that every facility of intercommunication granted them must prove highly serviceable.

We believe a case is here presented where the construction of a Railroad, with any tolerable regard to economy, must yield a fair return to the projectors; and this, were it even to terminate within the county of Essex. But we are not to stop here.

The States of Maine and New Hampshire will, ere long, seek to unite themselves more closely with the capital of Massachusetts, and through that with the great States of the West and South, and in so doing they will naturally adopt the most obvious means. In a climate where winter reigns for six months of the year, the impediments which might arise from heavy snows, are too apparent to be disregarded in the construction of a long line of Railroad. In order that this should be serviceable during the winter season, at which time its great benefit is to be expected, the milder and less exposed regions must be sought. A seaboard route, in these States, besides being less subject to accumulations of snow and ice, would be more direct than one through the interior. So that, whenever the connexion is made, our Road, on this account, as well as on many others, will offer advantages which can be found in no other direction. We may, then, fairly presume that to-day is completed the first link in the chain which is to bind our good city of Boston with the East.

A short time only can elapse before Massachusetts will be so intersected with Railroads, as to leave but a small part of the State without the benefit of this great improvement. May we not expect the most propitious consequences from the change?

With the completion of the Eastern Railroad, the Taunton branch to New Bedford, and a route through Plymouth to Cape Cod, the seaport towns on the coast will be so united as to form as it were one great commercial emporium, the extremes of which will be only four or five hours distant from each other, and possessing a mercantile fleet of nearly one-third the whole tonnage of the United States, and equal to that of the City of London in 1832. The merchant of Newburyport may then meet his friend from New Bedford, on 'Change in Boston, and each return home to dinner with the greatest ease. The farmer of the interior will find the Great Western Road offering to him a speedy and economical conveyance to market for his surplus produce at all seasons; while the manufacturer, now depending for the transport of his goods upon navigation frequently closed for months in the year, will find a safe and commodious passage to the West, even in mid-winter. It is by encouraging works of internal improvement like these, by giving every aid to commerce and mannfactures, by promoting the frequent intercourse of her citizens, by countenancing every reasonable project for the benefit and extension of her Capital, in the prosperity of which her own greatness is involved; and by thus creating a just and patriotic sentiment of state pride, that Massachusetts can expect to retain her population, and to hold that political rank to which she is fairly entitled. Her sons must be made to realize that the fields of honorable exertion are still open at home—that the barren soil on which their eyes first opened, has proved a blessing rather than a curse, by arousing the energies, quickening the invention to provide the means of subsistence, and calling into action every power of mind and body.

Where the earth spontaneously pours forth its fruits, man becomes slothful and degenerates. The fertile plains of the South and West may tempt their imaginations with the vain hope of competency and ease, but can yield no product compared with the moral advantages which here surround them. If we cannot boast a climate of perpetual spring, we are at least free from the noxious and pestilential vapors of an exuberant

vegetation. The rude winds of the North may not greet the poet's ear with half the sweetness of the balmy zephyrs of the West, but they breathe no deceitful influence. They come not to captivate with mild perfumes, and the poison of death lurking beneath; but they sweep boldly and fearlessly over the land, bearing nothing but vigor in their train; tinging the cheek with the ruddy glow of health, strengthening the nerves, and bracing the sinews of industry, and elevating the whole physical and intellectual condition of man.

Louisville, Cincinnati and Charleston Railroad Company.

The President and Directors of this company met in the city of Lexington on the 27th of August. Present,

ROBERT Y. HAYNE, President.

DIRECTORS.

From Kentucky.—Robert Wickliffe, Gen. James Taylor, Dr. Richardson and J. B. Casey, Esq.

From North-Carolina.—Dr. Hardy and Charles Baring, Esq.

From Tennessee.—Judge Reese and V. W. Humes, Esq.

From South-Carolina.—M. King, B. T. Elmore, Col. R. G. Mills and Dr. Dunnovant.

The President made a full report of all the measures to be adopted for the prosecution of the work since the last general meeting of the Board, from which it appeared,

That Banking privileges had been conferred upon the Company by the States of North and South-Carolina and Tennessee; and that measures had been adopted for putting the bank into operation early in the winter; that the State of South-Carolina had subscribed *a million of dollars* to the Road, and had guaranteed a loan of two millions more, to effect which, Gen. James Hamilton had proceeded to Europe; that Tennessee had subscribed $650,000 to the Road, and that the amount of public and private subscriptions exceed eight millions of dollars, including two millions taken by the Stockholders in the Charleston and Hamburg Railroad, according to the terms of the contract with that Company. It further appeared, that in conformity with the directions of the Stockholders, at their last general meeting, the Charleston and Hamburg Railroad (extending from Charleston to Augusta in Georgia, a distance of 136 miles) had been purchased, and was in a course of rapid improvement—the Road in its entire extent (with the exception of a few miles, which will shortly be finished,) having been *embanked*, and a new and improved iron having been already laid down for upwards of 100 miles, and the balance of the new iron having been ordered from Europe. It appeared, that although these extensive improvements had necessarily been made at an expense considerably exceeding the present receipts, yet that the business and income of the Road were very large, and constantly increasing. The receipts exceed *one thousand dollars per day*, and the travelling, on an average, exceeding *one hundred passengers daily*. The following Table was exhibited, giving a comparative statement of the business and receipts from the time the Road went into operation up to the 1st July last; from which it will be seen that the business of the last half year, has been greater than at any former period:

Statement of the income of the Charleston Railroad, and of the number of passengers, and bales of cotton transported thereon, with the amount of the receipts on account of passengers, and freight and the mail.

	No. of passengers.	Am't of passage.	Am't of freight.
In 1834,	26,649	79,050	83,214
In 1835,	34,283	109,576	131,782
In 1836,	39,216	129,982	140,033
In 1837,	41,554	131,282	138,269
1st half of 1838,	23,618	80,548	78,046
Do. 1837,	22,506	71,202	45,581

	Mails, etc.	Total.	Bales of cotton.
In 1834,	4,294	166,559	24,567
In 1835,	8,374	249,753	34,760
In 1836,	1,597	271,613	28,497
In 1837,	10,663	280,214	34,395
1st half of 1838,	5,541	164,231	17,872
Do. 1837,	5,294	122,077	6,220

It further appeared that the main track of the Charleston and Ohio Road, leading towards the Mountains had been laid off, from a point on the Charleston and Hamburg Road, 62 miles from Charleston to Columbia, the capital of the State, 65 miles further; and that contracts had been made for the execution of the work, which was going on rapidly and successfully. Surveys have been executed along the whole line from Charleston to Lexington, and it had been ascertained that the Mountains can be passed with locomotive engines, at grades less than had been adopted on other Roads; and that no serious obstacles were presented to the construction of the work on any part of the line.

A report was made by Major M'Kee, the resident Engineer, accompanied by maps and profiles, showing the result of the survey on the several lines from Knoxville to Lexington, by Cumberland and Wheeler's Gaps. Among the important facts disclosed in this report, is the discovery of a new pass, by what is called Big Creek, (near Wheeler's Gap,) which promises to afford a ready passage across the Cumberland Mountains, without the use of inclined planes of stationary engines. This Gap has been ordered to be more accurately surveyed.

On a memorial from the subscribers in the neighbourhood of Covington and Newport, setting forth that, in consequence of the alteration in the charter, by which the Company is relieved from making the branch extending from Lexington to the Ohio river, in the direction of Cincinnati, they had determined to apply their funds at the proper time, to the making of that branch, for which purpose charters had been obtained, it was

Resolved, That these Stockholders should be permitted to withdraw their funds accordingly, which having been originally subscribed for that object, could not justly be devoted to other purposes.

A committee was appointed, consisting of Messrs. King, Wickliffe and Taylor, to enquire and report on the state of the funds of the Company in Kentucky, and the measures now proper to be adopted by them in this State, and we subjoin the following extracts from their report and resolutions, which were unanimously adopted.

From the report of the Resident Engineer, read by him to the Board, and submitted to the Committee, and the minute explanations given by him of the maps and profiles of the several surveys from Knoxville to

Lexington, it is manifest that a safe and practicable route exists for a railroad from Knoxville to Lexington. The present situation of the Company, and the yet unfinished state of part of the surveys, should prevent the Board, at this time, either from adopting themselves a permanent location of this Road, or from recommending such a measure to the approaching meeting of the Stockholders. But it is a most cheering fact, and ought to animate them in their arduous undertaking, that every one of the main routes surveyed is practicable, and affords a location for the Road, at an expense far within the means of the States through whose territories the portions of it will pass. The Company will persevere, and they look forward with confidence to the assistance of those States, for the completion of the Road within their limits. Under the existing regulations of the Company, every cent contributed by the States respectively, will be devoted to the erection of the Road within their several boundaries, until it be there completed. So that, as your Committee confidently believe, in no event that can occur, can their citizens fail to be benefitted by their assistance, to its full extent: and your Committee sanguinely hope that the time may speedily arrive, when a continuous railroad from Lexington to Charleston, will give to Kentucky the full benefit of a direct, speedy, and economical connexion with the Atlantic, and all the advantages of an excellent seaport for her growing and highly valuable commerce—where she can find a steady, ready, and good market for all her rich products, and for all those supplies required by her industrious, affluent, and enlightened population. She has but to will it, and it shall be accomplished. Your Committee cannot doubt that she will consult her true interests and her own honor, and come up with her own high spirit and unfailing enterprise to aid in this grand work, and entitle herself to the lasting gratitude of all her children.

Until Kentucky does make an efficient move in this matter, your Committee can neither flatter themselves nor the Board with the expectation that any successful progress in it can be made within her limits. She must set an example to her citizens, before they can be induced to engage in it with the zeal and determination which its great importance deserves. Your Committee believe that, were she to ratify the banking privileges that have recently been granted by the three other States, through whose territory the Road is to pass, that ratification would go far to secure to her the benefit of the Road, and as your Committee are convinced, she may render that benefit certain, by joining the two of her sister States, who have so nobly and liberally contributed to the funds for erecting the Road, and will hold shares in it proportionably to the amount subscribed by them.

2d Resolution, That the County Court of Fayette, and the individual subscribers in Kentucky, be invited to pay the last instalment on the stock subscribed by them; and that they be assured that every cent heretofore paid by them has been faithfully and exclusively employed towards the defraying of the expenses of explorations and surveys within this State, and all that may be hereafter paid by them on their subscriptions, shall be expended within the State of Kentucky, until the road be completed.

5th Resolution, That a survey as recommended by the Resident Engineer in his report, be made of the Gap across the Cumberland Mountain, to the eastward of Wheeler's Gap, that ascends on the one side by Indian or Big Creek, and descends on the other by Davis's Creek; and that the expenses of this survey defrayed from the funds raised in the State in which the pass is situated.

6th Resolution, That an application be made to the Legislature of Kentucky, at their next session, for their concurrence in the act granting Banking privileges to the company, and for such further aid as they may think proper to extend to our enterprise, and that the President of the company be requested to attend the Legislature, to urge this application, if he can attend consistently with the interests of the company.

The following resolution, offered by Mr. Wickliffe, was also adopted, viz.:—

Whereas it appears from the report of the Resident Engineer, that further surveys are necessary, to enable the Board of Directors to locate the Road from the city of Lexington, through the county of Fayette, to the Kentucky River.

Resolved, That the whole of the funds to be raised by the county, shall be applied, first, to the surveys, location and construction of the Road, and the *depot*, in the county of Fayette, as aforesaid.

After transacting much other business, the following resolution, offered by Judge Reese, was unanimousty adopted; after which the Board adjourned to meet at Ashville, N. C. on the 17th of September.

Resolved, That the measures adopted since the opening of the General Board at Flat Rock, in October last, (as reported by the President,) be, and they are hereby approved of and confirmed; and the President be and he is hereby authorized, to adopt such measures as may be necessary to carry the same into full effect; and that a committee, to consist of the Directors residing in Charleston, and of those residing in Columbia and its vicinity, be, and are hereby appointed, to consult with, and advise the President as to the further measures to be adopted, to complete the repairs and improvements of the Charleston and Hamburgh Road—to provide the means for paying for the same, and for such an organization thereof as they may deem desirable, with authority to borrow money on the credit of the Company, and to call for another instalment when necessary; that the works now in progress be prosecuted to the extent of the means at the disposal of the Company; and that all the necessary appropriations be, and they are hereby made.

(Continued from page 129.)

Minutes and Proceedings of the Institution of Civil Engineers, containing Abstracts of Papers, and of Conversations for the Sessions of 1837.

May 23, 1837.

The President in the Chair.

The paper by Mr. G. H. Palmer, commenced at the last meeting, having been concluded, a discussion took place on the duties of Engines. The question was asked, whether the water raised had been actually measured, and whether the calculations were not made from the known contents of the working barrel. It was the opinion of several present that the duties had always been ascertained in the latter manner. An engine in which the Cornish system is adopted, near London, has a duty of fifty millions, and the Cornish system of clothing was considered as effecting a very considerable saving in fuel.

"Account of some Blasting operations through the white Limestone on the Antrim Coast Road, in the north of Ireland; by William Bald, Civil Engineer, M.R.I.A., F.R.S."

In the commencement of the paper, the nature of the Antrim Coast and of the white limestone, and the method of blasting, are briefly described. This limestone is similar to the chalk of England in the flints which it contains, but it is exceedingly indurated. From the results of the blasting of several large masses of rock, it appears that *one* ounce of powder will rend 14·12 cubic feet of this limestone when in blocks; whereas the same quantity of powder was required for 11·75 cubic feet of loose whinstone blocks. The specific gravity of the white limestone is very nearly 2·760, and of whinstone or basalt about 3·200. The induration of white limestone may be estimated from the fact, that two men will bore *one* foot deep in half an hour, the diameter of the augers or jumpers being from 1⅞ to 2 inches.

A table is given exhibiting the diameter of the auger or jumper used, and the number of inches of gunpowder put in—*one* pound of gunpowder occupies *thirty* cubic inches. The force of the explosion of gunpowder is assumed to be as the cube of the line of least resistance; if the *one* ounce of gunpowder will open a distance of 1 foot of rock, 2 feet would require 8 oz., and 10 feet 1000 oz. There will be some difficulty in ascertaining the line of least resistance in stratified rocks, since the rock may be fissured, or some bed or opening may lie near to the line bored; but the hypogene rocks, as granite and sienite, lying in compact unstratified masses, present no such difficulty.

The paper is accompanied by drawings and sections, and showing the mode pursued in blasting down high cliffs, by boring at the *toe* of the rock; the peculiar character of the veins commonly called scull veins, from their strong resemblance to the satures of the scull, which traverse the blocks of white limestone: and concludes by expressing the importance of collecting accounts of the quantity of gunpowder consumed per cubic yard in blasting the various kinds of granite, sandstone, &c.; also the diameter of the augers or jumpers; the depths bored, and the quantity of gunpowder the most effective.

May 30, 1837.

The President in the Chair.

"On the results obtained by Mr. G. H. Palmer, respecting the Maximum Duty of a given quantity of Atmospheric Steam; by Thomas Webster, M.A., Sec. Inst. C. E."

The object of this paper was to show, that the result obtained by Mr Palmer, in his paper on Steam, read at the two previous meetings of the Institution, coincides very accurately with the authenticated accounts of the best Watt engines. In the calculation made by Mr. Palmer, no account is taken of the heat rescued by employing over again the hot water. This, considering the relative quantities of latent and sensible caloric in steam, may be taken at one-sixth; and being taken into the account, we may consider that, on the principles laid down by Mr. Palmer, the duty done by a Watt engine ought to be about thirty-two millions.

The next question is, what amount of saving is to be attributed to the system of clothing adopted in the Cornish engines. This it is stated may change the data entirely; the quantity of water evaporated may be very different: the quantity of heat saved and worked over again incalculable; at present then we cannot apply any principles of theoretical calculation to this case.

"Further Observations on Blasting the white Limestone of Antrim Coast, by William Bald, Civil Engineer, F. R. I. A."

These further observations are directed more especially to the principle assumed by Mr. Bald in his previous communication, that the force of the explosion of gunpowder is as the cube of the length of the line of least resistance. This is the law which Vauban and Belidor have been led to assume as the result of their investigations, and Mr. Bald proceeds to show that his experiments confirm it. It appears from the experiments there detailed, that 1·9 oz. was required for the smaller blocks, and 2 oz. for the larger, per cubic yard. Knowing then the quantity of gunpowder used, and the solid contents of the blocks, we have only to extract the cube root of the cubical contents of their respective masses. Taking then the length of the line of least resistance in each of these cubes to be equal to the distance from the centre to the nearest point on the surface, we know from the preceding calculation the lengths of these lines, and it appears that these experiments confirm the law of the explosive power of gunpowder, being as the cube of the line of least resistance.

The paper concludes with remarks on the purposes for which this limestone is adapted, and on the ravages to which all calcareous rocks are subject from the Pholas Dactylus, and is illustrated by drawings of the forms, fissure of the limestone, and of the beautifully radiated and fluted shell of the Pholas. From the curves traced by nature in this shell, the engineer may learn the best shape to be given to the slopes of breakwaters and harbours exposed to the ocean.

"On Warming and Ventilating; by James Horne, F.R.S., A. Inst. C.E."

In this paper the author describes a method of warming and ventilating, on the principle of spontaneous ventilation, by means of an iron stove, care being taken that the *quality* of the air is not affected by the iron plates exceeding a certain temperature; and mentions a successful attempt to warm and ventilate a chapel on the same plan.

Mr. Horne gives also an account of a method which he had adopted to ventilate an extensive drift or level, by forcing in air. The machine, a drawing of which, with all the details and dimensions, is annexed, consists of an upper cylinder, inverted, and working in a lower cylinder nearly full of water. An attempt was first made to ventilate by drawing out the foul air; this, however, did not succeed The level is 7 feet high, and 4 feet 6 inches wide, and driven a mile before a rise into an upper level; the rise was then put up 400 feet in height; both level and rise were ventilated successfully by this apparatus. The diameter of the ventilating pipe was 5 inches, its length a mile. This showed most satisfactorily that ventilation could be effected by forcing in air through a great length of pipe.

Some conversation took place on the power expended in producing this ventilation, and on the friction of air forced through pipes; and reference was made to several cases which seemed to show that air could not be forced with effect through a great length of pipe, as for the purpose of blowing blast furnaces, whereas some experiments seemed to show that air could be forced through small pipes of 50, 100, or 150, in length, with the same velocity under a given pressure.

Mr. G. H. Palmer stated, that if 100 cubic feet of air could be forced through a small hole under a pressure of one inch of water in a given

time, only 25 cubic feet would be delivered under the same pressure through a pipe 1000 feet in length in the same time.

Mr. Hawkins stated, that in the old Thames Tunnel a two-inch pipe had been found quite insufficient for ventilation at a distance of 400 feet, but that a three-inch from the same bellows, and under the same pressure, had been quite sufficient. In the former case it was suggested that the friction of the pipe was nearly the same as the pressure in the bellows, so that the air was simply condensed.

Several other instances and experiments were quoted, and it appears that we must often consider whether the condensation has had to time to take effect. The air may be condensed rapidly and none forced out, but if the operation takes place slowly, the condensation will have time to take effect.

South Carolina Railroad.

A report of the South Carolina Railroad, leading from Charleston to Hamburgh, during the first six months of the present year, has just been published. The income during the six months amounted to $164,231, the whole of which has been exhausted in expenses, and improvements in the machinery, so that no dividend can be made. There has been a gradual increase of income each year since the opening of the road.

Two great improvements have been for a long time in progress, and one of them is nearly completed. One of these improvements is the substitution of an embankment, for the support of the rails, on the decay of the timber on which they were originally supported. This is all completed, with the exception of about five miles in extent, which is under contract to be finished in October next. Before covering the wood work with the embankment, it has been completely repaired. The other improvement is the substitution of a heavier iron, for that which was originally laid down. Considerable progress has been made in this change, and the new iron is wanting on only 45 or 46 miles. Where the new iron has been laid, the expense of the repairs is much diminished.

In conformity with an arrangement made in January last, nearly all the stock, viz. 19,217 shares out of 20,000 has been sold to the Cincinnati and Charleston railroad, and the stock transferred. The other proprietors have not refused to sell, but accidental circumstances have prevented the transfer. The directors recommend an increase of the rates of toll for passengers and freight.

The Welland Canal.—You are perhaps aware that there have been great complaints against this canal, and that its expense is far greater than its income—that it is often out of repair, &c., and fears are entertained that in time it will be altogether unfit for use, unless something be immediately done to the locks &c. When the Earl of Durham visited the upper province, care was taken to make him acquainted with the whole matter; he saw at once its importance, and authorized such improvements as will ensure the navigation of this important link between Lakes Erie and Ontario, upon a much enlarged scale. The locks, which are now of wood, are to be of cut stone. It now requires forty-one locks to reach the summit levels—underthe new arrangement twenty-one

only will be necessary. They are to be twenty-six feet wide, and one hundred and twenty feet long.

At Port Dalhousie, the outlet into Lake Ontario, there will be a capacious basin for steamboats and other craft, which will be entered by two locks, to be forty-five feet wide and two-hundred feet long. This basin will probably be protected by a fortification, which can easily be constructed; and should it be deemed expedient, it can be made a strong hold. The entire length of this canal will be 28 miles and a few chains. I understand from the chief engineer that the whole of the mason work will be completed without stopping the navigation for a moment, as the new locks will be built at some distance from the present site.

Thus in three years the whole line will be completed according to the new plan. At present the canal is said to be doing a good business, but when the improvements are completed, a large increase is expected. There will be no want of funds. The commissioners on the part of the government are Col. McAuley, Dr. Joseph Hamilton, and the Hon. John Wilson, formerly Speaker of the Assembly—on the part of the stockholders, Hamilton Merritt, Esq. and Colonel Creighton.

The Nashville Railroad offers many attractions to visitors. The cars travel out now a distance of twelve miles, where the road meets the Lake —at that point a house is building designed for a hotel, which will soon be ready for the entertainment of guests—by the first of September it is expected that a few rooms will be ready for use. From the site of this establishment a wide and noble prospect opens—on one side the lake expands its blue surface, stretching as far as the eye can reach, with here and there a sail gliding upon its bosom; while on the other an extensive prairie spreads around for miles, covered with tall luxuriant grass, presenting to the eye a sea of verdure in contrast with the liquid plain, that meets the view in the opposite direction. The scenery along the whole route after leaving the city is highly interesting, and at many points picturesque and imposing. The sight of the prairies alone, would more than compensate the trouble of a visit. The vicinity of New-Orleans furnishes no *ride* into the country, in which may be enjoyed such an enchanting variety of agreeable and entertaining objects. The mechanism of the drawbridge over which the steam cars cross the canal, is particularly worthy of notice. By the use of a stationary steam engine, the bridge is moved into its connexion with the rail-way in 30 seconds, so that the whole work of drawing and withdrawing the bridge may be done in one minute. Before the skilful machinist, Mr. Tayler, resorted to the application of steam, an hour was sometimes spent in making the same movement by hand—this improvement must be a great saving of time and labor. The rapid progress the company is making in the construction of the road is astonishing. Under the management of the enterprising President, Mr. Caldwell, and the able and accompliched engineer, Mr. Hord, every thing seems to *go ahead*. The rail track is advancing now at the rate of two miles per month. By the first or fifteenth of November it is expected that cars will travel to the plantation of Mr. Labranche—a distance of twenty miles from the city; and on the first of March, the road will be completed to Pass Mauchae. So soon as this point is reached, the railway will begin to bring in a large revenue to the Company, as it will be used as the thoroughfare for all the produce and commerce of Lake Maurepas, and the adjacent country.

Immense quantities of lumber and firewood will come from that quarter, and extensive supplies of marketing, in the shape of vegetables, poultry, fruit, milk, game, &c. The grant of the last legislature will be sufficient to carry the road that far. The brilliant success and obvious advantages of that scheme must, no doubt, lead to more liberal appropriations, till at length a general enthusiasm shall seize upon the country; when every man convinced of the importance of the enterprise, will put his shoulder to the wheels, and push our rail cars *with a rush* to Nashville. To bring about this desirable state of popular feeling, nothing more is necessary than to study and comprehend to the real extent, the facilities and benefits that must accrue to New Orleans from the structure of this great highway. Should every housekeeper in the city make a present of $500 to the Company, he would in twelve months after the completion of the road, find himself more than compensated in the cheapness and plenty with which the necessaries of life could be obtained, and the numberless conveniences and luxuries that were brought within his reach. Already the public mind begins to be enlightened on the subject, and the way the undertaking promises to progress is rapid and flourishing.—*N. O. Bulletin.*

The Great Bridge.—The magnificent Railroad Bridge over the James River, which we noticed in the course of the last week, was opened on Wednesday night, for the transportation of the cars. Yesterday, the cars from Petersburgh passed over to the Depot on this side, within a few yards of the Bridge—and after 10 o'clock, two other cars passed over from the Richmond side to the Manchester side; the first with the passengers who had just arrived in the Northern Car—and the other contained several ladies and gentlemen, who were willing to try the experiment of passing over the river on this air built Bridge. The cars glided over with the greatest ease—presenting the most beautiful views of the surrounding landscape to the delighted passengers. We understand the Railroad too has already been encouraged beyond calculation—and that it is likely to prove a source of considerable profit to the proprietors, by the contribution of the passengers alone. But the completion of the Depot is calculated to invite the transportation of produce. At present, the cars will pass two and fro, twice in the 24 hours—besides an extra car in the course of the week. We confess we take a deep interest in a company, which has thrown over the James River, the noblest Bridge in North America.—*Richmond Enq.*

The Bridge of Cabzag.—A remarkable bridge is now considerably advanced in France, which will be one of the most remarkable structures of the kind in the world. It is a suspension bridge, of five arches or spans, each of which is 300 feet in width. The floor will be 70 feet above the surface of the water. The suspension chains will be supported by columns of cast-iron 90 feet in height, resting on pedestals of masonry.

American Locomotives.—The U. S. Gazette states that Mr. Norris last week shipped a second locomotive engine from Philadelphia for Austria, to be used on the long railroad extending to Wagram. It is expected that two more will be made for the same destination. This circumstance is highly creditable to American mechanics, and evinces the estimation in which our skill and enterprise are held in Europe.

LONG ISLAND RAILROAD.

Will be issued from this Office in a few days, in pamphlet form, with Lithographic illustrations; a full description of the Long Island Railroad, by an Engineer—which was designed to make the commencement of a series of pamphlets—if Engineers can be induced to prepare them describing full and complete descriptions of the different Railroads and Canals in the United States, which are, and as shall may be hereafter completed. 5tf

AVERY'S ROTARY ENGINE.

This Engine is now in use in various parts of the country, and is found to possess important advantages, as a driving power, for *Saw-Mills, Flouring Mills, Cotton Factories, Sugar Mills and Blacksmith Shops*, over the ordinary Piston Engines.

Its advantage consists in economy in the first cost, and also in the cost of *fuel, repairs, and attendance*. Wherever one of them has been put in operation by a person acquainted with them, others have been ordered, and it will continue to be so wherever they may become known.

Orders for Engines, and Mill Machinery addressed to this office, or to Mr. Joseph Curtis 71 Attorney street, will be promptly attended to. D. K. MINOR, Agent. tf

PATENT AGENCY OFFICE AT WASHINGTON.

WILLIAM P. ELLIOTT, Artist, for many years employed in the *Patent Office*, will devote a portion of his time to the preparation of papers and drawings for applicants for Patents, and attend to the procuring of patents for useful inventions without the necessity of a journey to Washington; and will give information by *mail*, as to the originality of the names previous to applying for patents.

All communications must be free of postage. His Office is at room No. 10. Patent Office Buildings, Washington, D. C.

Washington, April 20, 1838. 3y1—8t

PATENT HAMMERED RAILROAD, SHIP, AND BOAT SPIKES.

The Albany Iron and Nail Works, have always on hand, of their own manufacture, a large assortment of Rail Road, Ship and Boat Spikes, from 2 to 12 inches in length, and of any form of head. From the excellence of the material always used in their manufacture, and their very general use for Railroads and other purposes in this country, the manufacturers have no hesitation in warranting them fully equal to the best Spikes in market, both as to quality and appearance.

All orders addressed to the subscriber at the works, will be promptly executed.

JNO. F. WINSLOW, Ag't.
Albany Iron and Nail Works.

The above Spikes may be had at Factory prices of Cornelius Corning, & Co., Albany Hart & Merritt, New York; Jas. H. Whitney & Co., Boston, Ely Eting, Philadelphia; Wm. E. Coffin & Co. Boston. 1y

PATENT SAFETY FUSE,

For Igniting the Charge in Blasting Rocks, both in dry places and under water.

To those acquainted with and accustomed to using the Fuse, comment or description is unnecessary; to those who are not, we would simply observe, that it is unimportant how much to persons employed or concerned in Blasting, as by its use that hitherto dangerous operation is rendered as safe as the ordinary employments of the Farmer. It insures certainty, and prevents an explosion as well under water as in the driest situation, adds much to the force of the blast, and by removing the priming proves unnecessary, as we shall note.

Numerous certificates from those who have tested the Fuse might be given, but the following is deemed sufficient.

CERTIFICATE.

Having seen the Patent Safety Fuse for Blasting tested to our satisfaction, we cheerfully certify, that we are convinced that it saves much time and labor—adds to the force of the blast—ensures certainty, and renders blasting perfectly safe. Besides, it is we think, CHEAPER than the common straw Fuse. For dry blasting it is a great improvement; but for blasting in wet ground, it is invaluable. Messrs. T. Hitchins & Co., contractors on the Erie canal, certify that they have been engaged in the Cornish mines, England, where the Fuse is exclusively used and that it has never to their knowledge, caused a miscarriage. They confirm our above expressed opinion of its value. We make no doubt that it will soon be in universal use in blasting operations.

DAVID HAMILTON,
Superintendent repairs, Erie Canal.
W. J. McALPINE,
Assistant Engineer Erie Canal Enlargement.
J. HOUGHTON,
Engineer Cohoes Company.

COHOES, December 16, 1837.

The Fuse is manufactured by Baron, Bickford, Eales and Co. at Simsbury, Hartford Co., Conn., orders directed to them, or either of their agents, will be promptly attended to.

Agents for selling the Patent Safety Fuse.

David Watkinson & Co., Hartford, Conn.
A. G. Hazard & Co., 125 Fulton-st., N. Y.
Erastus Corning & Co., 391 South Market-street, Albany, N. Y.
E. F. & A. G. Smith, 29 Exchange-street, Rochester, N. Y.
H. Kingman & Co., Buffalo, N. Y.
Curtis & Hand, 16 Commerce street Philadelphia, Penn.
Pratt & Keith, South Charles-street, Baltimore, MD.
G. R. Peake, Richmond Va.
W. B. Peake, Fredericksburgh, Va.

SHEET LEAD, &c.

THE Subscribers, Manufacturers of Sheet Lead, Lead Pipe, Red Lead and Litharge—have always an assortment in store, and for sale, at 175 Front Street, corner of Burling Slip.

CORNELL & TUCKER.

☞ Sheet Lead and Lead Pipe for Fortifications and Engineering, Milled any thickness and size to order.

New-York, March 10, 1838. 3t.

GENESEE VALLEY CANAL.

NOTICE—Sealed proposals will be received by the Canal Commissioners of the State of New-York, until 5 o'clock P. M. on the 31st day of October next, for constructing about 50 miles of the Genesee Valley Canal, extending from Mount Morris, Livingston county, to the north end of the summit level near Cuba, Allegany county; together with all the Culverts, Aqueducts, Waste Weirs, Bridges, Cesspools, Feeders, Dams and Bulkheads on the same. Also, 83 Stone Lift Locks, one Guard Lock, a deep Cut near Col. Williams of 73 feet at the deepest point, and averaging about 38 feet for the distance of half a mile: and a Tunnel or thorough cut through a spur of Portage Hills of nearly a third of a mile long. Many of the sections are very heavy, particularly those in the vicinity of the Tunnel, and deep cutting.

All the work is to be of the most substantial character.

Two Lines have been located over Portage Hills, one of which is called the River route, and the other the long Tunnel route.

Propositions will be received for the construction of the work on both lines, and the undersigned reserve the right of accepting the propositions for either one of said lines.

Sealed proposals will also be received by the Canal Commissioners, until the time above mentioned, for constructing Four Stone Lift Locks, namely, numbers 1, 2, 3 and 4; and the culverts and sections numbers 12, 13, 14, 15, 16, 17, 20, 22, 25, 26, 27, 28, 29, 32, 33 34, 35 and 36; on the line of canal between Rochester and Mount Morris. Also, for all the Lift Locks on the Dansville Branch being eight in number; and the culverts on sections numbers 1, 2, 3, 4, 5 and 7 of the same. Some of the above Locks and Culverts have been commenced under contracts since declared abandoned. The proposals for such work must be made with the understanding that the contractor is only to receive pay for that part of the work remaining to be done; and that he is to take the materials on hands at the estimate of the Chief or Resident Engineer. The prices for work must include the expense of materials necessary for the completion of the same, according to the plans and specifications that will be exhibited at the time of receiving proposals.

The work between Rochester and Mount Morris, must be completed by the first day of June, 1840. That on the Dansville Branch, by the first day of October 1840. And the work from Mount Morris to the north end of the summit level by the first day of July 1842.

The prices for excavation and embankment, will be considered as including the expense of shaping and trimming the banks. The owners of the land through which the Canal passes, will be permitted to remove the timber from the line, if they do it at such times, and in such manner, as not to impede the progress of the contractors in the construction of the work.

Security will be required for the performance of contracts, and the propositions must be accompanied by the names of responsible persons, signifying their assent to become sureties. If the character and responsibilty of those proposing, and the sureties they offer are not known to the undersigned, or to the Chief, or the Resident Engineer: a certificate of good character, and the extent of their responsibility signed by the first Judge or Clerk of the county in which they severally reside, will be required. No transfer of contracts will be recognized. The plans of the structures, with specifications of the kinds of materials, and the manner of construction, will be ready for examination on the 25th day of October next, at the General office of the Chief Engineer, in the village of Mount Morris: and also at the offices of the Resident Engineers, for the work to be let on their respective divisions; at which time, and places, the Chief, or Resident Engineers, will attend to give all the necessary information, and furnish the blank propositions. The names of parties to the propositions, and the names of their sureties, must be written out, at full length.

Persons proposing for more work than they wish to contract for, must specify the quantity they desire to take.

The parties to the propositions that may be accepted, will be required to enter into contracts immediately after the acceptance of the same.

The undersigned will attend at Mount Morris on the 31st day of October, to receive propositions; and they reserve the right of accepting such propositions only, as they deem for the interest of the state.

Dated September 22d, 1838.

WM. C. BOUCK,
JONAS EARL, Jun.
JOHN BOWMAN,
WM. BAKER,
Acting Canal Commissioners.

TOPOGRAPHICAL DRAWING.

For instruction in this and other branches of Drawing useful to the profession, apply at this office.

...ATION OF TIMBER.

...RIETORS of the invention of ... Bill, of London, by which ... saturated throughout with a ... which has been found an efficient ... against ordinary decay, the dry ... gribble worm, having made such ... thereon as have rendered the ... more simple and efficient, are prepared ... contracts for the preparation of ... dispose of the right of using the ...

... in question is believed to afford ... protection to wood, even in the ... and disadvantageous positions, at ... than any other which has yet been ... It is applicable to every case in ... is employed; and is particularly ... of attention in the blocks with which ... are paved, the rails and sleepers of rail... ... frames and planking of the gates of ... docks. The timber used in building docks ... preserved, when the ravages of the worm ... to be feared, and the piles and the beams ... in every species of hydraulic construction. ... details of the process may be learned, and ... made known, on application to

JAMES TREAT,
General Agent of the Proprietors.
No. 4, Wall st. New York.

Certificates.

... have witnessed a number of the experi... operations, made for the purpose of ... the practicability of Robert Bill's pro... for the preservation of timber. In these ... we have seen, that by the addition of improve... to the original method, the perfect sea... ... of timber, by the separation both of its ... and uncombined moisture, could be effect... ... thus almost every description of wood on ... which experiment was made, was thoroughly ... with the protecting material; and ... in the single instance, (hemlock,) through ... pores the injection was not complete ... was done to exclude all access of ... The proprietors have certificates of ... experiments of wood, prepared by Bill's method ... most severe trials, for a space of five ... but were not this proof in their possession ... would be clear, from the high antiseptic ... of the material they employ, that ... fully saturated with it, cannot be sub... to any of the ordinary causes of decay. The ... of the same material to repel the gribble ... is universally admitted even when mere... applied to a casting; but when injected ... it must act as a perfect protection.

... College, N. Y. May 25, 1838.
JAMES RENWICK, LL.D.
... of Natural and Experimental ... Philosophy and Chemistry.

... system by the British Government to ... Robert Bill.

... prepared by Mr. Robert Bill was ... dry rot pit in His Majesty's yard, ... where it remained for five years, ... and perfectly withstood the fungus rot, whilst numerous other specimens were destroyed in a fifth part of that time. Other pieces were placed in the sea, by the master shipwright at Sheerness; and white wood, considered imperious to the gribble worm, was nearly eaten up, these remained untouched. Some specimens of timber, so prepared were placed in the earth at his Majesty's yard, Deptford one half their length being buried, and the other half protruding above ground, and pieces cut from the same tree, but unprepared, were put to competition with them; at the end of five years the former remained unchanged, the latter entirely destroyed. These experiments prove that the inferior sorts of timber may be made, at a small expense, far more durable than oak, or perhaps any known wood from which great national benefits may be derived.

JOHN KNOWLES.
Secretary of the Navy Board.

GENEVA, N. Y. 15th June, 1838.

Having seen several specimens of Wood saturated with Coal Tar (so called,) and believing its use would greatly tend to the preservation from decay of all exposed timber, in structures for Railroads, Bridges or Canals, I recommend its adoption, and believe said wood would prove to be one of the greatest elements of economy that has ever been introduced into works where timber forms a chief material.

J. G. SWIFT,
Late of the U. S. Army

LOCOMOTIVE ENGINES.

The subscribers have for sale in England, on account of whom it may concern:

Two very superior light locomotive engines with tenders, &c. complete. These engines are suitable for roads, the superstructure of which are of wood with flat bars. They are of BURY'S celebrated pattern, and would no doubt give great satisfaction.

ALSO—

Two 6 wheel engines of 11 tons weight, with fuel and water. These engines are of very superior workmanship. One of them could be delivered at New York, and the other in Philadelphia;

ALSO—

Two 4 wheel engines, warranted by the manufacturers not to weigh more than 7½ tons, with fuel and water. These engines are of a lot of 8 made at one establishment, of a particular pattern. Some of them are now running, and give very great satisfaction.

A. & G. RALSTON & CO.
South Front st. Philadelphia.

Who have on hand 800 tons of T rails, 2½ by 5-8, 2 by ½, 1½ by ½, 1 1-4 by 1-4 and 1 by 1-4 flat bar rail road iron. Also Rims for Locomotives, cars, &c. &c. Orders for rail road iron executed as usual.

3 2m

NOTICE TO RAILROAD CONTRACTORS.

Western and Atlantic Railroad of the State of Georgia.

In addition to the 30 miles of this railroad farmed out for construction in April last, the grading and masonry on another equal portion of the same work, is now offered for contract.

SEALED PROPOSALS

Therefor, will accordingly be received at the office of the board of commissioners in Cassville, Cass county, Georgia, between the eighth and thirteenth of October next, during which time, engineers will be in attendance on the line of the road to point out the localities, and explain by the aid of plans and profiles of the route, the nature and extent of the work to be done.

This portion of the route traverses a limestone region, abounding in springs, and streams of fine water. The climate of the country is mild and salubrious. The frosts of winter are never so severe as to prevent easy and successful grading, even in the most inclement part of that season.

The time for the fulfilment of contracts will be amply sufficient for this purpose.

This and all other conditions relating thereto, will be exhibited in printed proposals and articles of agreement, blank copies of which will be in readiness for inspection, filling and signature, at the time and place above designated.

Credentials setting forth the character and competency of the contractors unknown to the commissioners will be required.

By order of the board of Commissioners.

S. H. LONG, Ch'f Eng'r.

Office of the W. & A. R. R.

Marietta, July 12, 1838. 4-3t

NEW ARRANGEMENT.

ROPES FOR INCLINED PLANES OF RAILROADS.

WE the subscribers have formed a co-partnership under the style and firm of *Fisher & Coleman*, for the manufacturing and selling of Ropes for inclined planes of railroads, and for other purposes; and to supply ropes for inclined planes, of any length required without splice, at short notice, the manufacturing of cordage, heretofore carried on by S. Darlie & Co., will be done by the new firm, the same superintendent and machinery are retained by the new firm that were employed by S. Darlie & Co. All orders will be properly attended to, and ropes will be shipped to any part in the United States.

12th month, 12th, 1838. Hudson, Columbia County, State of New-York.

ROBT. L. FISHER,

33—tf GEORGE COLEMAN.

THE NEWCASTLE MANUFACTURING COMPANY

Continue to furnish at the works situated in the town of Newcastle, Delaware, Locomotive and other Steam Engines—Jack Screws, Wrought iron work and Brass and Iron Castings, of all kinds connected with Steamboats, Railroads and Mill Gearing of every description. Cast Wheels (chilled) of any pattern and size, with axles fitted also with wrought Tires; Springs, Boxes and Bolts for Cars; Driving and other Wheels for Locomotives.

The works being on an extensive Scale, all orders will be executed with promptness and dispatch. Communications addressed to Mr. William H. Dobb, Superintendent, will meet with immediate attention. ANDREW C. GRAY,

President of the Newcastle Manufact'g Co.

Newcastle, Del. March 6, 1838. 1y.

Literary and Scientific Course of Columbia College.

The students of this course will assemble in the College on Monday 1st October. Candidates for admission into the several classes will be examined on Friday, 28th September.

The object of this course is to afford to such persons as may not wish, or may not be prepared to enter upon the classical studies pursued in the college, full instruction in the mathematical, mixed, and physical sciences. For this purpose they are admitted to the instruction of the professors of those departments, and entitled to all the privileges of students to the regular classes. In addition they have opportunities of pursuing the studies of English literature and history. The course has been planned with much care, as a preparation for the professions of the civil engineer, the architect, or the conductor of manufactures, and in order more effectually to accomplish these objects, additional instructors are engaged, and arrangements made to teach the practice of engineering in the field, the use of instruments, the manipulations of practical chemistry, architectural, geometrical, and topographical drawing, &c. For these objects, great facilities are afforded in the increase of the apparatus, models and collections of the college.

A CARD.

A young man of unexceptionable character having a desire to become practically acquainted with the business of a civil engineer, respectfully offers his services to any Railroad company as an assistant. He has some knowledge of mathematics, and is capable of repairing any mathematical instrument, having served an apprenticeship at said business, but is induced to this measure by a preference for more active life. Personal application at the office, or a line addressed to the editor of the Railroad Journal will meet with due attention.